ETC

A REVIEW OF GENERAL SEMANTICS

SUMMER 1954

an international quarterly concerned with the role of language and other symbols in human behavior and human affairs

In Volume XI, Number 4:

WILLIAM H. SCHNEIDER continues his series of semantic caricatures: "Danger: Men Talking."

What are the conditions of and obstacles to creativity? Papers by CARL R. ROGERS and MELVIN TUMIN.

Technological models of the nervous system and their effect on thought are discussed by ANATOL RAPOPORT.

ANTONY G. N. FLEW shows how models are used in ethical analysis.

Articles and discussion by HERBERT HACKETT, WILLIAM CATTON, JR., DORIS B. GAREY, ELIHU FEIN.

etc. etc.

One Dollar

ETC.: A REVIEW OF GENERAL SEMANTICS

OFFICIAL ORGAN OF THE INTERNATIONAL SOCIETY FOR GENERAL SEMANTICS, FOR THE ENCOURAGEMENT OF SCIENTIFIC RESEARCH AND THEORETICAL INQUIRY INTO NON-ARISTOTELIAN SYSTEMS AND GENERAL SEMANTICS. FOUR TIMES A YEAR: SEPTEMBER, DECEMBER, MARCH, JUNE.

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CONTENTS FOR SUMMER, 1954

[Published October, 1954]

DANGER: MEN TALKING, II (drawings)	William H. Schneider	243
TOWARD A THEORY OF CREATIVITY	Carl R. Rogers	249
OBSTACLES TO CREATIVITY	Melvin Tumin	261
TECHNOLOGICAL MODELS OF THE NERVOUS SYSTEM	Anatol Rapoport	272
CONSCIOUS USE OF MODELS IN ETHICAL ANALYSIS	Antony G. N. Flew	284
LANGUAGE AS COMMUNICATION: A FRAME OF REFERENCE	Herbert Hackett	290

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DISCUSSION:

THE MOUNTAIN WITH THE WRONG NAME — William R. Catton, Jr. — 299

THE MASK OF NIGHT — Doris B. Garey — 305

NOTES ON THE LIMITATIONS OF LANGUAGE — Elihu Fein — 308

DATES AND INDEXES — 312

INDEX TO VOLUME XI — 317

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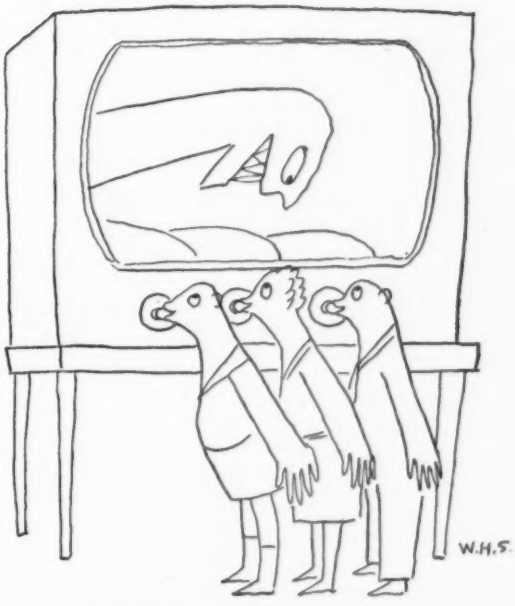
DANGER: MEN TALKING (II)

WILLIAM H. SCHNEIDER *



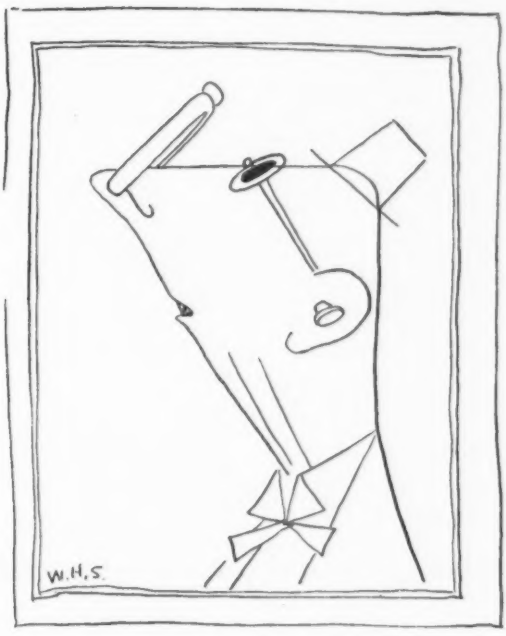
TELEVISION SUCKLING ITS YOUNG

* The Editors are happy to present a second group of drawings by William H. Schneider. The first group was published in our last issue (Spring, 1954). Drawings of both groups, along with others still unpublished, were exhibited at the Second Conference on General Semantics, held at Washington University, St. Louis, June 10-12, 1954. The exhibition was shown again at the Library of San Francisco State College, July 12 to August 10.

Mr. Schneider is art and copy director and vice-president of Donahue and Coe of New York.

DAWN OF LITERACY

IT'S A WORD-SOLVENT—CHANGES THE MEANING ANY WAY YOU WANT



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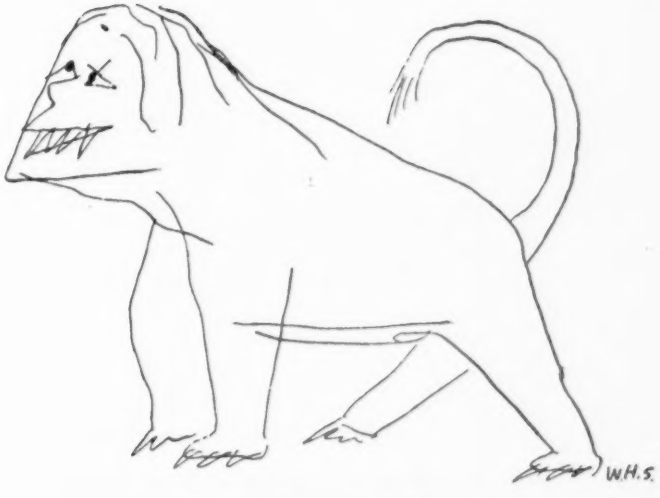
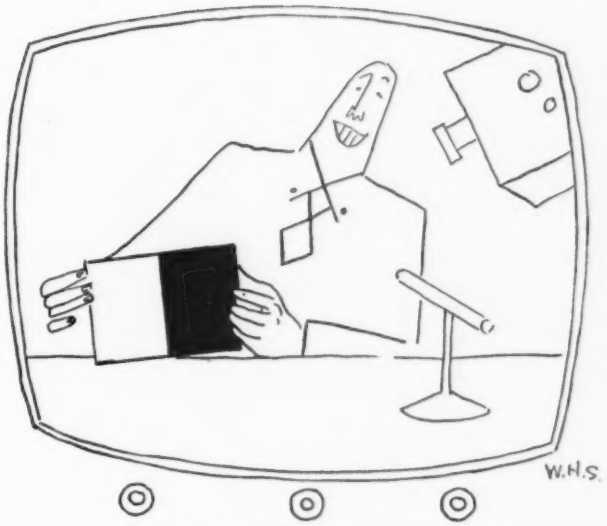


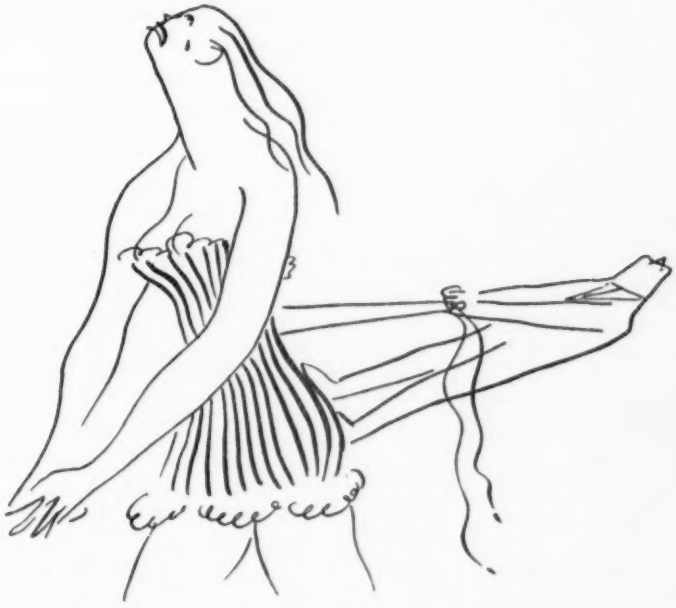
THE BAREFACED LIE

SWEEPING GENERALITY FOLLOWED BY PRIVATE OPINION

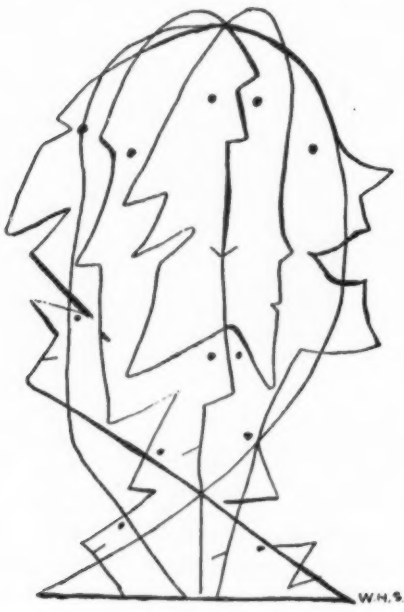
ALLEGORICAL DRAMA: PURE THEORY RECOILS FROM VULGAR PRACTICE



PRESTO! BLACK IS WHITE!



ATTEMPT TO FIT AN EMOTIVE WORD TO A DEFINITION



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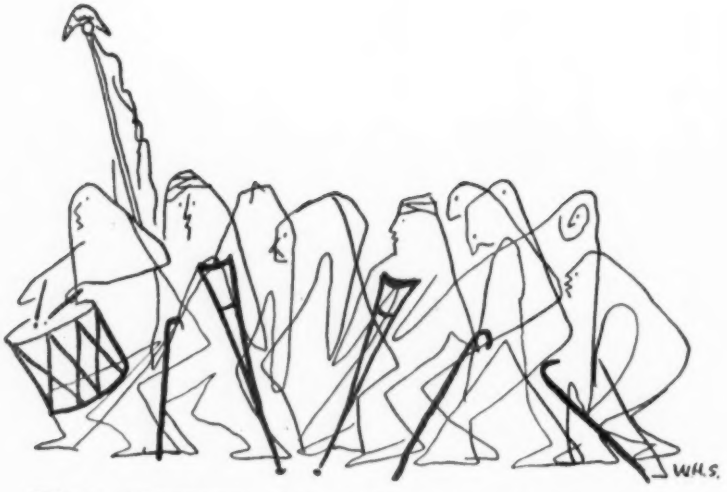

WORDS—RETURNING FROM AN INTERNATIONAL CONFERENCE

TOWARD A THEORY OF CREATIVITY

CARL R. ROGERS *

I MAINTAIN that there is a desperate social need for the creative behavior of creative individuals. It is this which justifies the setting forth of a tentative theory of creativity—the nature of the creative act, the conditions under which it occurs, and the manner in which it may constructively be fostered. Such a theory may serve as a stimulus and guide to research studies in this field.[1]

The Social Need

MANY of the serious criticisms of our culture and its trends may best be formulated in terms of a dearth of creativity. Let us state some of these very briefly:

In education we tend to turn out conformists, stereotypes, individuals whose education is "completed," rather than freely creative and original thinkers.

In our leisure time activities, passive entertainment and regimented group action are overwhelmingly predominant while creative activities are much less in evidence.

In the sciences, there is an ample supply of technicians, but the number who can creatively formulate fruitful hypotheses and theories is small indeed.

In industry, creation is reserved for the few—the manager, the designer, the head of the research department—while for the many life is devoid of original or creative endeavor.

In individual and family life the same picture holds true. In the clothes we wear, the food we eat, the books we read, and the ideas we hold, there is a strong tendency toward conformity, toward stereotypy. To be original, or different, is felt to be "dangerous."

* Professor of Psychology, University of Chicago, and author of *Counseling and Psychotherapy* (1942) and *Client-Centered Therapy* (1951).

[1] That I am much indebted to the thinking of others will frequently be evident, but especially I am indebted to the Conference on Creativity called together by a sponsoring group from Ohio State University, which nourished and vitalized my thinking and led me to produce the rough notes upon which this paper is based. The Conference was held at Granville, Ohio, December 5-8, 1952.

Why be concerned over this? If, as a people, we enjoy conformity rather than creativity, shall we not be permitted this choice? In my estimation such a choice would be entirely reasonable were it not for one great shadow which hangs over all of us. In a time when knowledge, constructive and destructive, is advancing by the most incredible leaps and bounds into a fantastic atomic age, genuinely creative adaptation seems to represent the only possibility that man can keep abreast of the kaleidoscopic change in his world. With scientific discovery and invention proceeding, we are told, at the rate of geometric progression, a generally passive and culture-bound people cannot cope with the multiplying issues and problems. Unless individuals, groups, and nations can imagine, construct, and creatively revise new ways of relating to these complex changes, the lights will go out. Unless man can make new and original adaptations to his environment as rapidly as his science can change the environment, our culture will perish. Not only individual maladjustment and group tensions, but international annihilation will be the price we pay for a lack of creativity.

Consequently it would seem to me that investigations of the process of creativity, the conditions under which this process occurs, and the ways in which it may be facilitated, are of the utmost importance.

It is in the hope of suggesting a conceptual structure under which such investigations might go forward, that the following sections are offered.

The Creative Process

THERE are various ways of defining creativity. In order to make more clear the meaning of what is to follow, let me present the elements which, for me, are a part of the creative process, and then attempt a definition.

In the first place, for me as scientist, there must be something observable, some product of creation. Though my fantasies may be extremely novel, they cannot usefully be defined as creative unless they eventuate in some observable product—unless they are symbolized in words, or written in a poem, or translated into a work of art, or fashioned into an invention.

These products must be novel constructions. This novelty grows out of the unique qualities of the individual in his interaction with the materials of experience. Creativity always has the stamp of the individual upon its product, but the product is not the individual, nor his materials, but partakes of the relationship between the two.

Creativity is not, in my judgment, restricted to some particular content. I am assuming that there is no fundamental difference in the creative process as it is evidenced in painting a picture, composing a symphony, devising new instruments of killing, developing a scientific theory, discovering new procedures in human relationships, or creating new formings of one's own personality as in psychotherapy. (Indeed it is my experience in this last field,

rather than in one of the arts, which has given me special interest in creativity and its facilitation. Intimate knowledge of the way in which the individual remolds himself in the therapeutic relationship, with originality and effective skill, gives one confidence in the creative potential of all individuals.)

My definition, then, of the creative process is that it is the emergence in action of a novel relational product, growing out of the uniqueness of the individual on the one hand, and the materials, events, people, or circumstances of his life on the other.

Let me append some negative footnotes to this definition. It makes no distinction between "good" and "bad" creativity. One man may be discovering a way of relieving pain, while another is devising a new and more subtle form of torture for political prisoners. Both these actions seems to me creative, even though their social value is very different. Though I shall comment on these social valuations later, I have avoided putting them in my definition because they are so fluctuating. Galileo and Copernicus made creative discoveries which in their own day were evaluated as blasphemous and wicked, and in our day as basic and constructive. We do not want to cloud our definition with terms which rest in subjectivity.

Another way of looking at this same issue is to note that to be regarded historically as representing creativity, the product must be acceptable to some group at some point of time. This fact is not helpful to our definition, however, both because of the fluctuating valuations already mentioned, and also because many creative products have undoubtedly never been socially noticed, but have disappeared without ever having been evaluated. So this concept of group acceptance is also omitted from our definition.

In addition, it should be pointed out that our definition makes no distinction regarding the degree of creativity, since this too is a value judgment extremely variable in nature. The action of the child inventing a new game with his playmates; Einstein formulating a theory of relativity; the housewife devising a new sauce for the meat; a young author writing his first novel; all of these are, in terms of our definition, creative, and there is no attempt to set them in some order of more or less creative.

The Motivation for Creativity

THE MAINSPRING of creativity appears to be the same tendency which we discover so deeply as the curative force in psychotherapy—*man's tendency to actualize himself, to become his potentialities.* By this I mean the directional trend which is evident in all organic and human life—the urge to expand, extend, develop, mature—the tendency to express and activate all the capacities of the organism, to the extent that such activation enhances the organism or the self. This tendency may become deeply buried under layer after layer of encrusted psychological defenses; it may be hidden behind

elaborate facades which deny its existence; it is my belief however, based on my experience, that it exists in every individual, and awaits only the proper conditions to be released and expressed. It is this tendency which is the primary motivation for creativity as the organism forms new relationships to the environment in its endeavor most fully to be itself.

LET US NOW attempt to deal directly with this puzzling issue of the social value of a creative act. Presumably few of us are interested in facilitating creativity which is socially destructive. We do not wish, knowingly, to lend our efforts to developing individuals whose creative genius works itself out in new and better ways of robbing, exploiting, torturing, killing, other individuals; or developing forms of political organization or art forms which lead humanity into paths of physical or psychological self-destruction. Yet how is it possible to make the necessary discriminations such that we may encourage a constructive creativity and not a destructive?

The distinction cannot be made by examining the product. The very essence of the creative is its novelty, and hence we have no standard by which to judge it. Indeed history points up the fact that the more original the product, and the more far-reaching its implications, the more likely it is to be judged by contemporaries as evil. The genuinely significant creation, whether an idea, or a work of art, or a scientific discovery, is most likely to be seen at first as erroneous, bad, or foolish. Later it may be seen as obvious, something self-evident to all. Only still later does it receive its final evaluation as a creative contribution. It seems clear that no contemporary mortal can satisfactorily evaluate a creative product at the time that it is formed, and this statement is increasingly true the greater the novelty of the creation.

Nor is it of any help to examine the purposes of the individual participating in the creative process. Many, perhaps most, of the creations and discoveries which have proved to have great social value, have been motivated by purposes having more to do with personal interest than with social value, while on the other hand history records a somewhat sorry outcome for many of those creations (various Utopias, Prohibition, etc.) which had as their avowed purpose the achievement of the social good. No, we must face the fact that the individual creates primarily because it is satisfying to him, because this behavior is felt to be self-actualizing, and we get nowhere by trying to differentiate "good" and "bad" purposes in the creative process.

MUST WE THEN give over any attempt to discriminate between creativity which is potentially constructive, and that which is potentially destructive? I do not believe this pessimistic conclusion is justified. It is here that recent clinical findings from the field of psychotherapy give us hope. It has been found that when the individual is "open" to all of his experience (a

phrase which will be defined more fully), then his behavior will be creative, and his creativity may be trusted to be essentially constructive.

The differentiation may be put very briefly as follows. To the extent that the individual is denying to awareness (or repressing, if you prefer that term) large areas of his experience, then his creative formings may be pathological, or socially evil, or both. To the degree that the individual is open to all aspects of his experience, and has available to his awareness all the varied sensings and perceivings which are going on within his organism, then the novel products of his interaction with his environment will tend to be constructive both for himself and others. To illustrate, an individual with paranoid tendencies may creatively develop a most novel theory of the relationship between himself and his environment, seeing evidence for his theory in all sorts of minute clues. His theory has little social value, perhaps because there is an enormous range of experience which this individual cannot permit in his awareness. Socrates, on the other hand, while also regarded as "crazy" by his contemporaries, developed novel ideas which have proven to be socially constructive. Very possibly this was because he was notably nondefensive and open to his experience.

The reasoning behind this will perhaps become more clear in the remaining sections of this paper. Primarily however it is based upon the discovery in psychotherapy

> . . . that if we can add to the sensory and visceral experiencing which is characteristic of the whole animal kingdom the gift of a free and undistorted awareness of which only the human animal seems fully capable, we have an organism which is as aware of the demands of the culture as it is of its own physiological demands for food or sex; which is just as aware of its desire for friendly relationships as it is of its desire to aggrandize itself; which is just as aware of its delicate and sensitive tenderness toward others as it is of its hostilities toward others. When man's unique capacity of awareness is thus functioning freely and fully, we find that we have, not an animal whom we must fear, not a beast who must be controlled, but an organism able to achieve, through the remarkable integrative capacity of its central nervous system, a balanced, realistic, self-enhancing, other-enhancing behavior as a resultant of all these elements of awareness. To put it another way, when man is less than fully man—when he denies to awareness various aspects of his experience—then indeed we have all too often reason to fear him and his behavior, as the present world situation testifies. But when he is most fully man, when he is his complete organism, when awareness of experience, that peculiarly human attribute, is most fully operating, then he is to be trusted, then his behavior is constructive. It is not always conventional. It will not always be conforming. It will be individualized. But it will also be socialized.[2]

[2] From "Some of the Directions and End Points of Therapy," by Carl R. Rogers, in *Psychotherapy — Theory and Research Methods*, ed. by O. H. Mowrer (New York: Ronald Press, 1953).

The Inner Conditions of Constructive Creativity

WHAT ARE the conditions within the individual which are most closely associated with a potentially constructive creative act? I see these as possibilities.

A. OPENNESS TO EXPERIENCE: EXTENSIONALITY. This is the opposite of psychological defensiveness, when to protect the organization of the self, certain experiences are prevented from coming into awareness except in distorted fashion. In a person who is open to experience each stimulus is freely relayed through the nervous system, without being distorted by any process of defensiveness. Whether the stimulus originates in the environment, in the impact of form, color, or sound, on the sensory nerves, or whether it originates in the viscera, or as a memory trace in the central nervous system, it is available to awareness. This means that instead of perceiving in predetermined categories ("trees are green," "college education is good," "modern art is silly") the individual is aware of this existential moment as *it* is, thus being alive to many experiences which fall outside the usual categories (*this* tree is lavender; *this* college education is damaging; *this* modern sculpture has a powerful effect on me).

This last suggests another way of describing openness to experience. It means lack of rigidity and permeability of boundaries in concepts, beliefs, perceptions, and hypotheses. It means a tolerance for ambiguity where ambiguity exists. It means the ability to receive much conflicting information without forcing closure upon the situation. It means what the general semanticist calls the "extensional orientation."

This complete openness of awareness to what exists at this moment is, I believe, an important condition of constructive creativity. In an equally intense but more narrowly limited fashion it is no doubt present in all creativity. The deeply maladjusted artist who cannot recognize or be aware of the sources of unhappiness in himself, may nevertheless be sharply and sensitively aware of form and color in his experience. The tyrant (whether on a petty or grand scale) who cannot face the weaknesses in himself may nevertheless be completely alive to and aware of the chinks in the psychological armor of those with whom he deals. Because there is the openness to one phase of experience, creativity is possible; because the openness is *only* to one phase of experience, the product of this creativity may be potentially destructive of social values. The more the individual has available to himself a sensitive awareness of all phases of his experience, the more sure we can be that his creativity will be personally and socially constructive.

B. AN INTERNAL LOCUS OF EVALUATION. Perhaps the most fundamental condition of creativity is that the source or locus of evaluative judgment is internal. The value of his product is, for the creative person, established not by

the praise or criticism of others, but by himself. Have I created something satisfying to *me?* Does it express a part of me—my feeling or my thought, my pain or my ecstasy? These are the only questions which really matter to the creative person, or to any person when he is being creative.

This does not mean that he is oblivious to, or unwilling to be aware of, the judgments of others. It is simply that the basis of evaluation lies within himself, in his own organismic reaction to and appraisal of his product. If to the person it has the "feel" of being "me in action," of being an actualization of potentialities in himself which heretofore have not existed and are now emerging into existence, then it is satisfying and creative, and no outside evaluation can change that fundamental fact.

C. THE ABILITY TO TOY WITH ELEMENTS AND CONCEPTS. Though this is probably less important than A or B, it seems to be a condition of creativity. Associated with the openness and lack of rigidity described under A is the ability to play spontaneously with ideas, colors, shapes, relationships—to juggle elements into impossible juxtapositions, to shape wild hypotheses, to make the given problematic, to express the ridiculous, to translate from one form to another, to transform into improbable equivalents. It is from this spontaneous toying and exploration that there arises the hunch, the creative seeing of life in a new and significant way. It is as though out of the wasteful spawning of thousands of possibilities there emerges one or two evolutionary forms with the qualities which give them a more permanent value.

The Creative Act and Its Concomitants

WHEN these three conditions obtain, constructive creativity will occur. But we cannot expect an accurate description of the creative act, for by its very nature it is indescribable. This is the unknown which we must recognize as unknowable until it occurs. This is the improbable that becomes probable. Only in a very general way can we say that a creative act is the natural behavior of an organism which has a tendency to arise when that organism is open to all of its inner and outer experiencing, and when it is free to try out in flexible fashion all manner of relationships. Out of this multitude of half-formed possibilities the organism, like a great computing machine, selects this one which most effectively meets an inner need, or that one which forms a more effective relationship with the environment, or this other one which discovers a more simple and satisfying order in which life may be perceived.

There is one quality of the creative act which may, however, be described. In almost all the products of creation we note a selectivity, or emphasis, an evidence of discipline, an attempt to bring out the essence. The artist paints surfaces or textures in simplified form, ignoring the minute variations which exist in reality. The scientist formulates a basic law of relationships, brushing

aside all the particular events or circumstances which might conceal its naked beauty. The writer selects those words and phrases which give unity to his expression. We may say that this is the influence of the specific person, of the "I." Reality exists in a multiplicity of confusing facts, but "I" bring a structure to my relationship to reality; I have "my" way of perceiving reality, and it is this (unconsciously?) disciplined personal selectivity or abstraction which gives to creative products their esthetic quality.

Though this is as far as we can go in describing any aspect of the creative act, there are certain of its concomitants in the individual which may be mentioned. The first is what we may call the Eureka feeling—"This is *it*!" "I have discovered!" "This is what I wanted to express!"

Another concomitant is the anxiety of separateness.[3] I do not believe that many significantly creative products are formed without the feeling, "I am alone. No one has ever done just this before. I have ventured into territory where no one has been. Perhaps I am foolish, or wrong, or lost, or abnormal."

Still another experience which usually accompanies creativity is the desire to communicate. It is doubtful whether a human being can create, without wishing to share his creation. It is the only way he can assuage the anxiety of separateness and assure himself that he belongs to the group. He may confide his theories only to his private diary. He may put his discoveries in some cryptic code. He may conceal his poems in a locked drawer. He may put away his paintings in a closet. Yet he desires to communicate with a group which will understand him, even if he must imagine such a group. He does not create in order to communicate, but once having created he desires to share this new aspect of himself-in-relation-to-his-environment with others.

Conditions Fostering Constructive Creativity

THUS FAR I have tried to describe the nature of creativity, to indicate that quality of individual experience which increases the likelihood that creativity will be constructive, to set forth the necessary conditions for the creative act and to state some of its concomitants. But if we are to make progress in meeting the social need which was presented initially, we must know whether constructive creativity can be fostered, and if so, how.

From the very nature of the inner conditions of creativity it is clear that they cannot be forced, but must be permitted to emerge. The farmer cannot make the germ develop and sprout from the seed; he can only supply the nurturing conditions which will permit the seed to develop its own potentialities. So it is with creativity. How can we establish the external conditions which will foster and nourish the internal conditions described above? My experience in psychotherapy leads me to believe that by setting up conditions of

[3] For this and the idea in the following paragraph I am specifically indebted to my student and colleague, Mr. Robert Lipgar.

psychological safety and freedom, we maximize the likelihood of an emergence of constructive creativity. Let me spell out these conditions in some detail, labelling them as X and Y.

X. PSYCHOLOGICAL SAFETY. This may be established by three associated processes.

1. ACCEPTING THE INDIVIDUAL AS OF UNCONDITIONAL WORTH. Whenever a teacher, parent, therapist, or other person with a facilitating function feels basically that this individual is of worth in his own right and in his own unfolding, no matter what his present condition or behavior, he is fostering creativity. This attitude can probably be genuine only when the teacher, parent, etc., senses the potentialities of the individual and thus is able to have an unconditional faith in him, no matter what his present state.

The effect on the individual as he apprehends this attitude, is to sense a climate of safety. He gradually learns that he can be whatever he is, without sham or facade, since he seems to be regarded as of worth no matter what he does. Hence he has less need of rigidity, can discover what it means to be himself, can try to actualize himself in new and spontaneous ways. He is, in other words, moving toward creativity.

2. PROVIDING A CLIMATE IN WHICH EXTERNAL EVALUATION IS ABSENT. When we cease to form judgments of the other individual from our own locus of evaluation, we are fostering creativity. For the individual to find himself in an atmosphere where he is not being evaluated, not being measured by some external standard, is enormously freeing. Evaluation is always a threat, always creates a need for defensiveness, always means that some portion of experience must be denied to awareness. If this product is evaluated as good by external standards, then I must not admit my own dislike of it. If what I am doing is bad by external standards, then I must not be aware of the fact that it seems to be me, to be part of myself. But if judgments based on external standards are not being made then I can be more open to my experience, can recognize my own likings and dislikings, the nature of the materials and of my reaction to them, more sharply and more sensitively. I can begin to recognize the locus of evaluation within myself. Hence I am moving toward creativity.

To allay some possible doubts and fears in the reader, it should be pointed out that to cease evaluating another is not to cease having reactions. It may, as a matter of fact, free one to react. "I don't like your idea" (or painting, or invention, or writing), is not an evaluation, but a reaction. It is subtly but sharply different from a judgment which says, "What you are doing is bad (or good), and this quality is assigned to you from some external source." The first statement permits the individual to maintain his own locus of evaluation. It holds the possibility that I am unable to appreciate something which is actually very good. The second statement, whether it praises or condemns, tends to put

the person at the mercy of outside forces. He is being told that he cannot simply ask himself whether this product is a valid expression of himself; he must be concerned with what others think. He is being led away from creativity.

3. UNDERSTANDING EMPATHICALLY. It is this which provides the ultimate in psychological safety, when added to the other two. If I say that I "accept" you, but know nothing of you, this is a shallow acceptance indeed, and you realize that it may change if I actually come to know you. But if I understand you empathically, see you and what you are feeling and doing from your point of view, enter your private world and see it as it appears to you—and still accept you—then this is safety indeed. In this climate you can permit your real self to emerge, and to express itself in varied and novel formings as it relates itself to the world. This is a basic fostering of creativity.

Y. PSYCHOLOGICAL FREEDOM. When a teacher, parent, therapist, or other facilitating person permits the individual a complete freedom of symbolic expression, creativity is fostered. This permissiveness gives the individual complete freedom to think, to feel, to be, whatever is most inward within himself. It fosters the openness, and the playful and spontaneous juggling of percepts, concepts, and meanings, which is a part of creativity.

Note that it is complete freedom of *symbolic* expression which is described. To express in behavior all feelings, impulses, and formings may not in all instances be freeing. Behavior may in some instances be limited by society, and this is as it should be. But symbolic expression need not be limited. Thus to destroy a hated object (whether one's mother or a rococo building) by destroying a symbol of it, is freeing. To attack it in reality may create guilt and narrow the psychological freedom which is experienced. (I feel unsure of this paragraph, but it is the best formulation I can give at the moment which seems to square with my experience.)

The permissiveness which is being described is not softness or indulgence or encouragement. It is permission to be *free,* which also means that one is responsible. The individual is as free to be afraid of a new venture as to be eager for it; free to bear the consequences of his mistakes as well as of his achievements. It is this type of freedom responsibly to be oneself which fosters the development of a secure locus of evaluation within oneself, and hence tends to bring about the inner conditions of constructive creativity.

Putting the Theory to Work

THERE IS but one excuse for attempting to discover conceptual order and stating it in a theory; that is to develop hypotheses from the theory which may be tested. By such testing profitable directions for action may be found, and the theory itself may be corrected, modified, and extended. Thus if this theory

which I have tentatively formulated is worthwhile, it should be possible to develop from it hypotheses which might be objectively tested in classes in the arts; in education outside of the arts; in leadership training groups whether in industry or the military services; in problem-solving groups of any sort. Let me suggest a few of the general hypotheses which might be given more specific and operational form for any of the above groups. They would apply whether one was concerned with the development of creative artists or creative leaders; with originality of design or creative methods of problem-solving.

HYPOTHESES REGARDING INNER CONDITIONS. 1. Individuals who exhibit a measurably greater degree of conditions A, B and C (openness, internal locus of evaluation, ability to toy with materials) will, over any given period of time spontaneously form more products judged to be novel and creative, than a matched group who exhibit a lesser degree of A, B and C.

2. The products of the first group will not only be more numerous, but will be judged to be more significant in their novelty. (Such a hypothesis could be given operational definition in art classes, problem-solving groups, or leadership training groups, for example.)

3. Condition A (openness to experience) can be predicted from conditions B or C, which are more easily measurable. (It is not at all certain that this hypothesis would be upheld, but it would be worth careful investigation. If conditions A, B and C are highly intercorrelated, then they could jointly be predicted from the one which proved most easily measurable. Thus we might gain clues as to how we might less laboriously select graduate students, for example, with a high creative potential.)

HYPOTHESES RE FOSTERING CONSTRUCTIVE CREATIVITY. 4. Given two matched groups, the one in which the leader establishes a measurably greater degree of conditions X1, X2, X3 and Y (psychological safety and freedom) will spontaneously form a greater number of creative products, and these products will be judged to be more significantly novel.

5. Conditions X1, X2, X3 and Y are not of equal importance in fostering creativity. By comparing different groups in which one or another of these conditions is emphasized or minimized it may be possible to determine which of these conditions is most effective in facilitating creativity.

6. A group in which conditions X1, X2, X3 and Y are established should, according to our theory, have more effective and harmonious interpersonal relationships than a matched group in which these conditions are present to a lesser degree. (The reasoning is that if creativity is all of a piece, then a group in which the fostering conditions are established should be more constructively creative in social relationships.)

7. The extent to which different groups in our culture provide the fostering conditions (X and Y) could be measured. In this way one could determine whether creativity is now being fostered to a greater degree by the family group, classes in schools and colleges, bull sessions, social clubs and groups, interest groups, military groups, industrial groups. (One wonders how college classes would show up in such a comparison.)

Conclusion

I HAVE endeavored to present an orderly way of thinking about the creative process, in order that some of these ideas might be put to a rigorous and objective test. My justification for formulating this theory, and my reason for hoping that such research may be carried out is that the present development of the physical sciences is making an imperative demand upon us as individuals and as a culture, for creative behavior in adapting ourselves to our new world if we are to survive.

> [F]aith in reason is not only a faith in our reason, but also—and even more—in that of others. Thus a rationalist, even if he believes himself to be intellectually superior to others, will reject all claims to authority since he is aware that, if his intelligence is superior to that of others (which is hard for him to judge), it is so only in so far as he is capable of learning from criticism as well as from his own and other people's mistakes, and that one can learn in this sense only if one takes others and their arguments seriously. Rationalism is therefore bound up with the idea that the other fellow has a right to be heard, and to defend his arguments. . . . One does not kill a man when one adopts the attitude of first listening to his arguments.
>
> KARL POPPER, *The Open Society and Its Enemies*

OBSTACLES TO CREATIVITY

MELVIN TUMIN *

SINCE this is a conference on creativity, I feel it important that the central term, creativity, receive at least a working definition if there is to be any order introduced into our thinking about it. In trying this definition, I would follow Dewey's lead and view "creativity" as the esthetic experience, which is to be distinguished from other experiences by the fact that it is self-consummatory in nature. This is to say, the esthetic experience is enjoyed for the actions which define and constitute the experience, whatever it may be, rather than for its instrumental results or social accompaniments in the form of social relations with others.

Of course, the social relations with others may be among the actions which define the experience and hence be a source of creative or esthetic gratification. So, too, the instrumental results may come later to enhance the feelings derived while in the process of the action. But there is a point in distinguishing between those actions which are primarily orientated toward end results, i.e., the instrumental, and those which are primarily orientated toward the process of action itself—the esthetic or self-consummatory.

When we distinguish among types of experience as above, we establish a systematic connection between our thinking about our *specific* problems here and certain very much more general problems of life in the large. We are dealing here with a distinction not only between attitudes in the *arts* but between general life orientations as well. I think that all human experiences can be classified into three categories, so far as the source of human satisfaction is concerned: (1) those in which the locus of satisfaction is in the extrinsic rewards received for performance; (2) those in which the locus of satisfaction resides in the social relations with others while in the performance; and (3) those in which the locus of satisfaction is in the very actions which constitute the performance.

If this three-fold classification be taken as reasonable, then, our specific

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orientation toward creativity in the arts gets tied in systematically with a whole host of other problems about social life and social action and thus gives a more general value to our ideas than they might otherwise enjoy.

IMMEDIATELY I am made mindful of the connections between the problem of creativity and the problems faced by any society which seeks to maintain itself as a viable organism. For society is an organization which depends for its continuity on (1) the effective allocation of its members to the various statuses which constitute that social organization, and (2) the conscientious fulfillment of the role performances attached to those statuses.

This is to say that any society desiring continuity must see to it that the persons who constitute the membership of the society shall be fitted into the places for which they have the requisite talents and skills and perform their functions to the best of their abilities. Society's concern is far more with the extent to which the jobs are performed effectively than with the problem of whether the performers are deriving esthetic gratifications out of their activities. As a result, in any society, members are rated relative to each other in terms of their functional efficiency and not in terms of the depth of the gratifications they receive from their functioning. And so, every society must standardize certain *external* marks of efficient performance as a device for maintaining effective watch and scrutiny over the vital social processes.

Some process of continuing judgment of the relative worth of individuals, as marked by certain external criteria, seems indispensable, then, to the continuity of any society. And every member of a society must learn this fact, and accept it, and have it as part of his deep awareness if he is personally to survive. What this means in turn is that a primary drive which seems to be built into every normal person in every known human society is the drive to receive a favorable definition of his worth to the society, and to do this by acquiring the external marks which certify that he is performing his expected roles in an efficient manner.

Immediately, then, we see that the human being, by virtue of his social nature, is oriented toward the judgment of others regarding his personal and social worth. He depends on these judgments. He cannot form a conception of himself independent of these judgments. And when he specifically fails to be concerned with such judgments, he tends to become marginal and deviant, often with considerable harm to his own sanity.

IN THE FIELD of emotional pathology, I would take it that one of the most frequent sources of trouble is with individuals who have somewhere and somehow acquired, out of their experiences with others, a notion that they are basically unworthy and undeserving of respect (love). By contrast, the adequately functioning individual appears to be one who has received deep as-

surances regarding his desirability out of his interaction with effective "others." Indeed, I would agree with Mead, Cooley and others that one cannot even form a conception of himself except by apprehending the definitions of him which are held by others. It is out of these perceptions of himself by others that the individual builds his own self-conception.

Much of human striving, therefore, can fruitfully be viewed as striving for a favorable place in the social order. This place may be marked by family, or wealth, or power, or physical appearance. But whatever the criteria by which persons are distinguished from each other, it seems clear that the vast majority of persons in any society are deeply motivated to strive for a favorable place.

All of this striving seems to have few, if any, *necessary* connections with those types of experience which we label esthetic or self-consummatory. What this is saying, in effect, is that societies seem quite capable of surviving without paying any specific attention to the problem of insuring that their members have deep creative experiences. We may not like the quality of a society which pays little or no attention to these facets of man. But the fact remains that societies *can* get along perfectly well without any attention to them, or at most, with a meager amount of attention.

The attitude of the society at large, then, so far as any individual member is concerned, is primarily instrumental. And the individual members have to learn the lesson that they must demonstrate their valuable instrumentality if they are to receive social recognition and reward. To the extent that the instrumental orientation is hostile to the self-consummatory (though it need not be), to that extent it may be said that society by its very nature is fundamentally hostile or at least indifferent to human creativity and far more friendly to the conception of man as an instrument of the social order.

FOR THIS REASON, among others, I hold that the striving for status, or "whatness" as Lawrence Frank puts it, is primary and prepotent when compared with the striving for individual unity and self sufficiency, or "whoness." One might hypothetically offer the proposition here that the capacity for and interest in one's creative self arises and is acted upon proportionate to the amount of status-assurance and security which the individual possesses. It is in these terms that I can understand the function of "acceptance" as a condition of effective creativity. For here, acceptance would mean that the individual felt integral to and within the social order and did not view his individual unique strivings for creative expression as undesirable marks which might result in his losing the favorable status-definitions he so urgently desires.

It is also only in these terms that I can make sociological sense out of the concept of "safety" which is so central to Carl Rogers' therapeutic theory. As I see it, "safety" is the condition which prevails when the individual has assurance regarding his basic worth, as measured by the approval and reassurance

of others, and thus does not necessarily see his striving for individuality and self-expressiveness as threatening to his status-acceptance. I do not see how the individual can come to this sense of safety except through his perception that others view him as desirable and as a significant and worthy member of society.

The theorem which follows from these considerations is that creativity, self-expressiveness, individual uniquenesses etc., will be exhibited or at least strived for proportionately to the amount of status-safety the individual brings with him into the choice-situation. This is a very different matter, of course, than the theorem which holds that when the individual is reassured by a therapist that he may feel safe and secure regarding his acceptance by the therapist, that then he will feel free to act creatively with regard to his inner potentials. For it is not at all certain that the therapist's reassurance is equal to the general social reassurance. And it is certain that as a society we cannot afford to wait until individuals have all been reassured by therapists, even if this were ultimately possible.

The net conclusion from the preceding theorems regarding assurance and safety, as they relate to creativity, is that creativity, as a search for and capacity to enjoy self-consummating experiences, comes subsequent to status-striving for the average man. For those individuals—the rare few—who break through to individuality and creativity without status-assurance, the creative life serves as the compensation for, the equilibrator, if you wish, of the imbalance presented in the status-life. Most individuals, however, cannot and will not dare take the challenge of the creative life until they reach a considerable amount of status safety and assurance.

FOR THE EDUCATOR, the import of these conclusions lies in the implication that there are serious obstacles in the path of evoking the creative urge (if it be there by nature) in students, obstacles which seem inherent in the very nature of society itself. If these remarks are verified, then the task of the educator, within the educational situation, is to discover special techniques for making the life of the creative seem especially desirable and interesting, in spite of the dangers which seem to be automatically sensed by so many people when they are first teased with the idea that there is more to life and living than the achievement of socially approved status positions.

With this view, of course, the educator proceeds very differently than if he holds the view that all the child needs is to be exposed to the creative life and it will take hold because it is prepotent in its attractiveness over the life of status-striving and conformity. Only for the rare few, I would contend, can the strive for inner expression become prepotent over the striving for social acceptance. For the vast majority I would urge that the striving for creativity can come only after some degree of status reassurance has been achieved.

If this is true, then the work of the educator is inextricably tied with the

work of the social reformer. For it is only as we have a society which limits its status-emphases to the minimum necessary that we have a society which permits the early and deep introduction of its members to the possibilities of more creativity in their lives. And the creation of such a society is the task of the social reformer. In that sense, the educator himself can help greatly by skillfully introducing his children into the notion that a society which has a minimum orientation to status is the one which has the possibility of having a maximum orientation to creativity.

MOREOVER, if status-striving in society is competitively orientated, so that one never feels status-secure so long as there are others who are judged more worthy than he, then, the fate for the vast majority of individuals is *status-insecurity*. The only antidote to this that I know of is the institutionalization of the social doctrine that a man is to be judged worthy, and as worthy as anyone else, so long as he does all that of which he is capable in his social roles, even though the tasks he performs may, by some other criteria, not be nearly so required or important to the society as the tasks performed by others. In brief, the notion of "from each according to his abilities" is the only value-antidote I know to the prevailing notion that men are to be judged worthy only in terms of the relative value of their products when measured against those of others. Under these latter terms, as stated above, insecurity regarding social worth is the essential and pervading tone of social and psychological life.

To the extent that the educator in the classroom competitively ranks the products of his students against each other, and hands out approval and reward proportionate to some scale of "excellence," rather than in terms of whether the child has realized his own inner potentials, to that extent the educator is contributing to the very social atmosphere which is so inimical to the creative life. In these terms, nothing is quite so hostile to the maximization of creativity as the competitive grading system which prevails in our schools. It is one thing to argue that grades must be given because all subsequent educational institutions also require them and we need them for "placement" purposes. But it is another thing to argue that grades at any point along the line, or all situations taken together, serve any purposes except to gear the school system into a competitive rating situation which prevails in the adult society.

EFFICIENT placement of individuals, in accordance with their talents and abilities, is required for social survival, and, in turn, certainly requires a rating apparatus. But placement by skill can function and be viewed as a rational procedure which benefits all, if it is *not* also a system for allocating disproportionate amounts of the good things the society has to offer to its members. And, there has never been any convincing demonstration, yet, that efficient allocation of talent and skills to the appropriate positions must *necessarily* be accompanied

by disporportionate rewards to the more talented and skilled members of the society.

It is only when a society genuinely seeks to discover the talent present in the population that we have a condition friendly to the evocation of the creative urges in man in the mass. Most existing systems of stratification (i.e., systems of allocation of status, roles, and rewards) are markedly ineffective in these regards. I have elsewhere argued (see my paper entitled "Some Principles of Stratification: A Critical Analysis" [1]) that even the American system, probably the most "open" stratification system, displays numerous deficiencies if its task is conceived as the discovery and training of the talent of the members of the society. For one thing, throughout, there runs the idea that scarce and rare talents must be especially rewarded with highly disproportionate amounts of the desired social goods and services if the possessors of these talents are to be motivated to make them available to the service of the public. Accompanying this is a patently marked disregard for the possibility of motivating persons at *all* levels of talent with something other than material rewards as bait. An expectable corollary of this is the tendency for the talented elite to become encrusted in positions of high power and prestige, and to limit access to those positions to an equally rarified elite in succeeding generations.

One consequence of such a system is the emphasis on the display of material goods as a mark of social status. All the instruments of mass communication contribute to furthering this emphasis. Children are socialized from the very beginnings of their lives in these notions. It is no accident, then, that the educator finds his children far more concerned with their "whatness," as marked by external criteria than with their "whoness," as marked primarily by the subjective sense of integrity and individuality.

To sum up at this point: Society perforce views each individual as instrumental. Perforce individuals seek to achieve the acceptable external marks which signify that they have been instrumentally valuable. Perforce they strive for social acceptance. Perforce they tend toward considerable conformity. Perforce the emphases on individuality, difference, creativity and the satisfactions of self-consummatory experiences are always at a handicap, so far as social support and social obstacles are concerned.

So much, then, by way of argument concerning the notion that the creative urge in man is sufficiently prepotent so that under conditions of psychological assurance and safety, these urges will be evoked. My own line of argument does not deny this. It does urge, however, that the requisite psychological assurance and safety are desperately hard to come by in a society orientated toward competitive rating for status and reward as marked by external criteria.

[1] *American Sociological Review*, Vol. XVIII (1953), pp. 387-394.

A SECOND major concern is with the notion that under conditions of psychological assurance and safety, men will tend to the "good" as against the "evil." Assuming for the moment that we generally agree as to what are the good and the evil, I would argue in support of the notion that we have no real predictability as to which way men will go when they are made to feel free to obey their own inner compulsions. Instead, I support the notion that men's inner compulsions are markedly ambivalent, and that at least a significant portion of these compulsions are toward actions which may be markedly evil so far as their consequences for others are concerned.

In support of this idea, I point to the fact that the most difficult overall task in the socialization of any child is to bring him to full awareness of the extent to which his own social survival depends on his making compromises between his own inner and individual strivings and the strivings of others with whom he must relate. As any parent will testify, it is no easy job to convert the self-seeking mass of energetic protoplasm known as the human infant into a social-child with awareness of his interdependence with the social world around him.

The social order in any society can be viewed, in these terms, as a constantly shifting equilibrium between the tendencies of individuals to accept social norms and the equally potent tendencies to try to secure the good things of life for themselves without regard for the welfare of others about them. In maintaining this equilibrium, we count heavily on the effectiveness of the *habit* of conformity as our basic instrument of social control. And we breathe deep sighs of relief when we finally observe the habituation of our children to norms of conformity which yield social safety to them and to those with whom they socially relate.

But then, those of us who are specifically concerned with the creative potentials in our children, have to discover techniques for making the *non-habitual* attractive enough so that our children will not grow up to be simply conformists or anti-social deviants. That this is a real problem is to be seen in the fact that crime and art are equally individual and different so far as the prevailing norms of behavior are concerned. So are musical-devotion and psychological pathology; so, too, are involvement in poetry and schizophrenic fantasy. In short, when one plays with the individual, unique, and dissident potentials in man he is playing with a double-edged sword. Only skillful handling of the highest order makes it possible to direct the individual and unique strivings of man into channels which are socially accepted, or at least not socially disapproved and negatively sanctioned, rather than into channels which get the individual into real trouble with society.

When it is claimed, therefore, that under proper social permissiveness, men will seek to actualize their inner potentials, one can agree with this without being particularly sanguine about what this self-realization will produce. If the "self" is composed as much of anti-social as of social tendencies, then, "self-

realization" in and of itself is useless as a guide to what ought to be done in the socialization of children. For it is clear that we want them to realize only parts of their "selves" and not their total selves.

ANOTHER WAY to put this issue is to realize that the process of socialization is as much a process of selective repression and inhibition as is it one of selective evocation and encouragement. Again any parent can testify to this. When we examine the things repressed and inhibited we discover that these are inner tendencies toward self-realization which have markedly anti-social characteristics. Not only this:—they are often tendencies toward behavior which if allowed to be manifested would produce genuine psychic strife and difficulty for the individual concerned. Such things as sibling jealousy and rivalry, hatred of parents and the accompanying sadistic fantasies and authoritarian predilections:—all of these seem to come early into the lives of so many of us and require repression and inhibition, lest, in the process of giving vent to them, we destroy ourselves as well as others. How, then, can we aim toward self-realization *per se?* Must we not aim at self-realization of a highly selective nature?

To return to the question of habit once again. We have seen how vital is the formation of certain habits of conformity in order to provide a minimum basis of comfortable adjustment to our social environment. Once established, habit yields a comfort and a smoothness which we are loth to give up. The life of the creative, however, demands that in any situation of choice we should at least be tempted by the excitement of the new and untried ways as well as by the comfort and ease of the habitual.

All other things being equal, it seems that the prepotence in any choice situation is with the habitual rather than the new. The problem then is to bait the new and the possibly creative with an inducement value. The best inducement value we have available is some experience with what can happen to you when the "new" is chosen and you discover the excitement inherent in it, as well as the self-growth inherent in the process of converting the new into the creative.

Fortunately for man, there are two universal situations:—one universal to childhood and youth and the other universal to adulthood which are self-consummatory in their essence. I refer to childhood and youth play and to adult sexual intercourse. It is quite clear from what little or how much we know that the essence of play and of sexual intercourse are that they must be enjoyed for themselves—i.e., for the actions and experiences which constitute them, and not for any extrinsic or instrumental reasons, or else their unique qualities and the potential of unique enjoyment inherent in them are lost. Note, for instance, how vital is the loss of self-consciousness and self-awareness for the full enjoyment of both these experiences. How closely analogous, then, at least in these elements, are these experiences and those of the artist at his easel.

I do not know how to make use of these in an educational situation. Nor am I sure that there is contagion and transfer value from experiences in one area of life to those in other areas. But at least, approaching the situation, we may be encouraged by the fact that all of the people we are concerned with will probably have had some experience of a self-consummatory nature which may provide us with some head start.

As I THINK over the materials in my own particular field of research interest —occupational sociology—I am mindful of the fact that most of the current interest in industrial sociology is with attempts to discover methods of making workers content and productive even though the satisfactions inherent in creative work situations have been removed from the average job. There are literally thousands of plans to make men more "job satisfied" and more "job productive" and virtually all of them are variants on two basic themes: (1) improve the external rewards for work; (2) improve social relations at work. In the last ten years there has not been one significant contribution by way of new thoughts on how to make the work itself more inherently satisfying.

I take it that this implies that the vast majority of those who are concerned with job satisfaction and production—and most of these are management personnel and their paid experts—either never were aware of the concept of "joy at work" or have decided that the exercise of the "instinct for workmanship" is incompatible with the maximization of profits through mass production of standardized goods.

However, the studies of workers at their jobs and the sources of discontent on the job have at least provided us with a check list of the conditions of work under which men feel that their work is dull, routine and dissatisfying. That check list includes the following:

1. When the productive goals are set by others.
2. When operating techniques are standardized.
3. When detailed operations are routinized.
4. When the work product is not seen as meaningful in a larger social context.
5. When the individual sees himself as almost immediately replaceable.
6. When experimentation on the job is specifically discouraged.
7. When the emphasis is upon quantity vs. quality of the end product, even though the antithesis is not necessary.
8. When the differences in individual talents, and the quality of individual talents is made irrelevant by standardization.
9. When problems which arise during the course of production are settled by fiat from above.
10. When the occupation itself is seen by the worker as being socially depreciated by others, especially by his superordinates at work.

There is considerable overlap in these ten points, but by and large they describe the average condition of work for the average worker in our society.

The hypothesis I would offer is that when the contrary of these conditions is institutionalized into the work situation, the worker will have a significant opportunity to experience the satisfaction of the self-consummatory act. In time, this may come to be self-commending, and in time this may come to stand as an ultimate value for the worker for which he is willing to sacrifice other values which he now strongly demands.

In the interim, as a result of the impact of the average work situation, the worker tends to spend his most energetic hours at a job which does not draw his talents out of him; does not exercise his creative potential; does not afford him a sense of power and domination over the product and the machine but rather makes him feel subordinate to both; and provides him with no sense of significant contribution to and membership in the society. To the extent that these conditions prevail, it is my hypothesis that the average worker comes to his home-life and community-life with a net deficit of psychic satisfactions. He, therefore, brings to these extra-occupational life spheres a high demand upon them by way of the kinds of gratifications he seeks and the degrees of intensity with which he seeks them.

THESE HIGH DEMANDS of high intensity tend to result, as I see it, in four types of social pathologies:

a. An excessive quest for certainty, especially in the field of interpersonal relations, taking the form at times of political orthodoxy and xenophobia. I take these to derive from the absence of any reassurance at the job regarding the man's own social worth.

b. An excessive quest for power, manifesting itself in authoritarian attitudes at home, with resultant family pathologies, and in authoritarian attitudes in social relations in general, resulting in political pathologies.

c. An excessive quest for "meaning" resulting in frenetic status striving and in frenetic insistence on self worth, manifested by extreme sensitivity to possible imputations of worthlessness and in extreme and calculated disregard of the welfare of others, lest they indicate that one is acting deferential.

d. An excessive quest for social relationship in the form of "joining," or a pathological rejection of social relations and marked apathy and indifference to community affairs. I take these to be manifestations of the fundamental feeling of alienation from significant social ties which I hypothesize the worker derives from his work situation, especially when he realizes his substitutability and replaceability at virtually a moment's notice.

Put in the above form, these are crudely stated hypotheses, especially since the dynamics of each of these four pathologies are very complex and overlap

considerably with each other. But they will provide some operational measure, at least, of the impact of the work situation on the psychology of the average worker, as I see it operating at present.

What this signifies for our thinking about creativity is the fact that the denial of creative involvement at work results in socially significant pathologies with an import far beyond the scope of the job itself. It may well prove to be the case that if we desire our continuing high standard of production it is virtually impossible significantly to alter the work situation of the average man. If this is true, then social planning must take into account the net deficit which the worker is likely to bring to his family and social life and must be able to plan for the evocation, exercise and social use of those unused creative portions of man, the failure to use which tends to generate the pathologies mentioned above. Let us not kid ourselves. The way to the creative life for the average man is difficult in the extreme.

Diseases possess sufficient resemblances to be classed under general names; hence we possess the words peripneunomy, pleurisy, rheumatism, &c. I censure not physicians for constructing the names, nor for deciding that Thomas and Henry are severally afflicted with pleurisy; but their diseases are not as identical in nature as in language.

The identity which language implies is responded to by nature very nearly, or we could possess no medical science; but the most skilful physician is often defeated by the individualities of nature. Physicians have long detected these individualities, and deemed them anomalies of nature. The anomaly is, however, in language, which unites under one name, as identities, what is only partially identical. It is nature's regular production, and boundless richness.

A. B. JOHNSON, *A Treatise on Language*

TECHNOLOGICAL MODELS OF THE NERVOUS SYSTEM

ANATOL RAPOPORT *

IT IS NOT often that a book written in another age suddenly acquires an astonishing up-to-date-ness. This does happen when some prophecy suddenly passes from the realm of the fantastic to the realm of the imminent. Such a prophecy was contained in the book *Erewhon* by Samuel Butler, written in 1872. The prophecy has to do with the evolution of machines, particularly machines endowed with a property which has seldom been attributed to machines—intelligence. As stated by Butler in rather poetic terms, the prophecy envisages a world in which the machine becomes the dominant system of organization (in the way living things are systems of organization). Like living things, the machines of the future metabolize, reproduce, maintain themselves, and in general seem to have an aim in life. The one frightening thing about the *genus machina* is its parasitic dependence on the *genus homo*. The mechanism of natural selection is supposed to function in such a way on that form of "life" as to select those variations which are especially capable of catering to the compulsions of human beings—namely, their compulsions of caring for machines. Gradually, what had started as a symbiosis between man and machine passes into parasitism, so that finally man becomes domesticated by the machine.

Almost the same prophecy is stated in more realistic terms by N. Wiener in his *Cybernetics* (New York, 1948). Wiener envisages the Second Industrial Revolution ushered in by machines able to perform tasks requiring an average intelligence with the resulting dislocations and crises similar to those which followed the First Industrial Revolution, when the "stupid" machines first appeared on the scene of history.

Our purpose here is not to discuss the merits or the limitations of these prophecies, but rather to point out that the sudden dramatic revival of the "intelligent machine" idea (be it a metaphor or a myth or a profound insight) is indicative of a really significant historical event—a major intellectual revolution.

Like the Second Industrial Revolution, of which Wiener writes, this intellectual revolution is also the second in recent times. The first one occurred in the 17th century with the creation of mathematical physics. Perhaps I should make clear what I mean by an intellectual revolution. I think of such revolutions

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metaphorically as crystallizations of thinking around new, powerful concepts. In the 17th century these central concepts were those of mechanics—force, momentum, particularly energy. They became the central concepts of classical physics and of technology which came into being during the First Industrial Revolution.

The second intellectual revolution, now occurring, brought forward another powerful new concept, that of "quantity of organization," a concept of high degree of sophistication and bearing within it the seeds of extremely far-reaching consequences. It is this concept, also called negative entropy and "amount of information," which makes the anthropomorphic conception of the machine especially intriguing, particularly because through it the common features of "intelligent" or "purposeful" behavior of the higher animals and "automatic" behavior of "higher machines" are made apparent.

Now the personification of machines and "mechanization" of organisms are not new. The former has mythological roots in the medieval legends of the Golem and the Homunculus. The latter appears, for example, in the writings of Descartes.

The question "Are living beings machines?" has long been treated as a metaphysical question, presumably answerable on metaphysical grounds. Since metaphysics is more or less a lost art, we must learn to look at that question somewhat more critically, that is, with semantic awareness. We must translate it into other questions, such as, "To what shall the name 'living thing' be applied?" and "To what shall the name 'machine' be applied?" "Is there an overlap among the referents of the two terms?"

Putting the question this way, we see that the answers to the first are relatively clear, while the answers to the second are not nearly so clear. Barring certain borderline cases (viruses, etc.) we have no difficulty recognizing the class of objects to which the name "living thing" can be unambiguously applied. Not so with machines. This is so because living things are "given." They have remained about the same for as long as we can remember. But machines have evolved rapidly within the span of human history. We realize keenly that there are machines today which our grandfathers could not have dreamed of, and, by extrapolation, we feel that we can't really say what the limits of the world of machines may be. If we think about the matter a little more, we realize that machines in their evolution undergo "mutations" of tremendous magnitudes. Where it takes eons for a new biological species to develop, a new technological "phylum" has on occasion come into being within a generation.

BY A TECHNOLOGICAL phylum I mean something similar to a biological phylum. If the latter is defined by a very general plan of organization in a wide class of living things, the latter is defined in terms of a *principle of operation*. We can, if we wish, distinguish four technological "phyla," which came into being successively.

The first phylum we could call *Tools*. Tools appear functionally as extensions of our limbs and they serve primarily for transmitting forces which originate in our own muscles. In the transmission of force, sometimes a mechanical advantage is gained, as in the crowbar, a screw, or a pulley. However, the work done by a machine of this sort is actually work done by our own muscles. Therefore a machine of this kind, a tool, does not give the impression of "independent" action, and so it did not occur to any one to compare tools to living things.[1]

With the second phylum it is a somewhat different story. This second phylum of machines we could call *Clockworks*. In a clockwork a new principle of operation is at work, namely, the *storing* of mechanical energy. A typical clockwork is wound up, that is, potential mechanical energy is stored in it, which may be released at an arbitrary later time and/or over a prolonged period to time. A clockwork does give the impression of autonomous activity, and doubtless this crude resemblance of a clockwork to a living thing (residing in its quasi-autonomous activity) gave the craftsmen of the late Middle Ages and of the Renaissance ideas of constructing mechanical dolls and animals. Perhaps the first ideas of automata sprang from the same sources. Characteristically, Descartes speculated on the possibility that animals were elaborate clockworks and, equally characteristically of his age, excluded humans from this class, as possessors of "souls."

We may observe in passing that the bow and the catapult are also clockworks by our definition, since mechanical energy is stored in these machines to be released later (in the case of the crossbow, it may be released much later). However, the "autonomous" action of these machines is so brief that they do not give even the appearance of being "alive."

The first comparison of living things to machines, therefore, was made with regard to clockworks. It is not surprising that this metaphor was not particularly fruitful for the understanding of the living process. We know now, of course, that *energy* is stored in living things, but this energy is not stored in the form in which it is stored in clockworks (mechanical stress) and so was not recognized as such. Living things are not wound up to keep going, and this absence of the most essential characteristic of a clockwork in living things made the early mechanical interpretation of life a sterile one.

This comparison got a new lease on life with the appearance of the third phylum of machines. This phylum includes primarily the *Heat Engines*. Again an entirely new principle enters into their operation. As with tools and clockworks, the output of the heat engine is an output of energy which had been put into it. But whereas the energy put into the earlier classes of machines was in the form of mechanical stress, which is obviously associated with our own muscular effort, the energy put into a heat engine is contained in a *fuel*.

[1] However, personification of weapons does occur. Note also the legend of the Sorcerer's Apprentice.

Consider the vital difference between the two situations. It is obvious even to a child that the tool is not autonomous, because the tool is geared at all times to muscular effort. A child or a very primitive person may believe that a clockwork is autonomous, but it is still easy to convince him that it is not, because the winding up is still a result of some one else's muscular effort. No such effort is apparent in the fuel. Fuel is "fed" to the heat engine. The analogy to living things (which also need to be fed in order to operate) becomes ever stronger.

The comparison between heat engines and organisms passed beyond the metaphorical stage and bore real scientific fruits. It became apparent that fuel is in a very real sense the food of the engine and equally apparent that food eaten by organisms likewise functions as "fuel." The principle of energy conservation was shown to hold in living things—a serious blow to the contentions of the vitalists, which sent them on their long and tortuous retreat. Biochemistry was born. More and more processes characteristic of life were shown to be instances of processes reproducible in a chemical laboratory. An analogous revolution was occurring in technology. In fact, it would be not inaccurate to say that the First Industrial Revolution occurred when it became apparent that machines could be constructed which did not need to be "pushed" but only "fed" in order to do the work.

Driven out of physiology, the vitalists took refuge in psychology. Here, in the realm of thought and purpose, of emotion and insight, they felt they would remain safe from the onslaught of the mechanists, materialists, determinists, and reductionists. The label "nothing-but-ism" was derisively pinned on the philosophical outlook of those who believed that even the most complex manifestations of the living process, including the intricacies of men's psyche could somehow be described in terms of analyzable behavioral components which, in turn, could be related to observable events in space and time.

And so the focus of the battle between the vitalists and the physicalists shifted to psychology, where it remains at this time. The line between the two camps is, of course, not sharply drawn. Like the political spectrum ranging from extreme left to extreme right, the range of convictions concerning the nature of mental processes stretches from extreme behaviorism to vitalism or mysticism. The gestaltists can, perhaps, be assigned intermediate positions.

I AM SURE you all know the main outlines of the controversy. The opening offensive was undertaken by the behaviorists, the champions of what in some circles bears the unattractive name of S — R psychology. The method has a strong physiological bias. Technological analogies are frequently invoked. The earliest of these was the "telephone switchboard" model of the central nervous system. The environment was supposed to act on the organism by a series of stimulus configurations, which activated combinations of receptors, which initiated impulses, which traveled along nerve fibers, passed through the central

nervous system to other nerve fibers and into the effectors, whose activity accounted for the overt behavior of the organism, which was proclaimed to be a sole legitimate object of study in psychology. Behavior was viewed as a grand collection of units called reflexes.

The model was seen to be inadequate from the start. If to every configuration of stimuli there corresponded a definite set of responses, how was learning (the acquisition of new responses to the same stimuli) possible? However, this seemingly embarassing question proved a blessing in disguise, for the discovery of the conditioned stimulus by physiological means strengthened the reflex theory of behavior. It was shown that the paths of the impulses could be *systematically* changed. The switchboard model was shown to be still useful. Learning was accounted for by the "switchings" of the connections.

HOT ON THE HEELS of the behaviorists' successes, however, came a more serious critique, called *gestaltism*. Gestaltism deserves serious attention, because its ideas were the direct precursors of a new approach to the theory of the nervous system, which is the subject of the present discussion. The gestaltist critique was not simply a reiteration of the vitalist faith and did not confine itself to derisive labels like "nothing-but-ism" directed against behaviorism. It was much more specific and constructive and was based on at least two clearly identifiable characteristics of behavior, which did not seem to fit into the behaviorist scheme, namely, the recognition of "universals" and the equi-finality of response.

The recognition of universals means the following. Suppose an organism learns to respond to the sight of a particular square in a certain way and to a particular circle in a different way (say open a box marked with a square but not with a circle). The phenomenon is clearly an instance of conditioning. A strict behaviorist (telephone switchboard) explanation would have to rest on the assumption that the stimuli originating from the receptors activated by the sight of the square are "switched" by the conditioning process to paths leading to the proper effectors for opening the box. However, it is known that the conditioned stimulus can be varied considerably *after* the conditioning has been established and still elicit the response. For example, if the original conditioning was to a white square on a black background, it can be subsequently changed to a black square on a white background, which, at least in the retina, excites the *complementary* receptors, i.e., precisely those which were *not* involved in the conditioning process. Roughly speaking, the organism responds to the square as a "square," regardless of the receptors involved. Hence the emphasis on the term *gestalt* (the configuration perceived as a whole, rather than a complex of elementary stimuli). The gestaltists maintained that the behaviorists' emphasis on the stimulus response pathways detracted from the importance of "universals" or abstractions in the act of perception.

(If a counter-argument is offered to the effect that in the perception of a

geometric figure only the receptors affected by the edges of the figure are involved, it can be countered by other interesting evidence, such as the well-known phenomenon where familiar maps are not recognized if the continents appear in blue and oceans in yellow, or the still more baffling phenomenon that the shapes of objects can be recognized regardless of position, size, or orientation.)

The equi-finality of response argument is even more powerful. It has been observed that once an animal has learned to perform a task (say to run a maze to a reward) it will perform that task with whatever means are available to it. If its legs are amputated, it will *roll* through the maze. Clearly, such behavior cannot be explained in terms of a series of reflexes, each setting off the next, since the performance may involve totally different effectors each time.

This equi-finality of response naturally leads one to talk of *purposeful* behavior, in which only the *goal* is relevant and not the particular configuration of neural events which come into play. This seeming inevitability of invoking teleological notions opens the door to more vitalist arguments. The notion of "purpose" seems to resurrect the ancient classification of causes into "efficient" and "final" and to give new life to the ailing idea that the behavior of living and non-living things cannot possibly be governed by the same set of laws.

IT IS at this point that the concepts associated with the fourth phylum of machines become exceedingly important. We recall that the first phylum (tools) operated primarily as force transmitters; the second phylum (clockworks) as storages of energy resulting from mechanical stress; the third phylum (heat engines) as transformers of different forms of energy into mechanical energy. Now the fourth phylum of machines operates on the principle of storing and transmitting something called *information*.

Already the telephone switchboard model of the nervous system employs a technological analogy with a communication device rather than a conventional engine. The primary concern of psychology is not so much with "what makes the organism active?" as "how does it know what to do?" Not the source, the transformation, or the utilization of energy by the organism is of prime significance but its *organized* disposition. What the psychologist actually studies is not how much activity has been performed but the sequence of specifically directed acts, which when organized one way may give one set of results and organized in another way (or randomly performed) may give an entirely different set, even though the amount of energy expended remains the same. To give a homely example, consider the difference between closing the door and then turning the key and turning the key and then closing the door. The machines of our fourth phylum are primarily concerned with *systematizing* operations in which utilization of energy is involved. The amount of energy used is not important. The "power" of these machines is not "muscular" power but "mental." The giants among them are capable of receiving, transmitting, and

storing complex sets of directions, i.e., large amounts of "information." This is why technological analogies with these machines are of particular interest in psychology. These machines simulate not muscular effort (like their ancestors did) but human intelligence.

Just as the concept of energy and its transformations was able to explain the "activeness" of organisms, which could not be explained on the basis of externally applied stress (as tools are activated) or by internally applied stress (as clockworks are activated), so the concept of "information" promises to do the same for a much larger area of the living process, namely, the "intelligent" and "purposeful" aspects of living behavior.

What is this thing called information? There is now a wealth of literature on the subject and it is not within the scope of this presentation to develop the ideas of this literature. I think, however, that a reasonably good idea of the nature of "information" can be given by a few examples. I will not attempt to make these ideas precise. I will try to appeal to intuitive understanding, even at the risk of being vague.

Information bears a similar relation to energy as organization to effort. One can best see this in an example where the inadequacy of a theory based on energetic considerations alone is obvious. Consider the automobile traffic in a large city. Suppose the proverbial man from Mars decided to study this traffic. He might measure the rate of flow of cars along the city's arteries. He would correctly relate that flow to the speed with which the cars traveled and, being a good physicist, he would relate the speed to the power of the engines. And so he would be satisfied, perhaps, in explaining the rate of flow by energetic considerations.

Next suppose that all the traffic lights failed. Certainly the speed of the cars and thus the rate of flow of traffic would be reduced. Suppose our Martian stuck to his conceptualization in terms of energetics. He would then have to ascribe the reduced flow (or speed) to some failure of the automobile engines, and he would be wrong. The failure is not of the engines but of the traffic lights. True, it takes energy to activate the traffic lights, but it is negligible compared with the energy it takes to move the cars. Energy has therefore little to do with the traffic problem under consideration. The key concept is not that energy but of *directions for the utilization of energy* (commands "stop" and "go" properly patterned), i.e., a matter of *information*. If the traffic lights are not functioning, the driver of a car does not know what to expect at each intersection and, playing safe, he slows down. The accumulated slow-downs of all cars at all intersections turn out to have a greater effect on the over-all slowing of traffic than the occasional full stops at the red lights. In the case of regulated traffic lights, set for certain speeds, the flow of traffic is most efficient. The cars are, in effect, "organized" or bunched up along the roads in such a way that the bunches on one system mesh with the empty spaces on the system perpendicular to it, and the flow is continuous without stops.

Examples can be multiplied at will. Children well-trained in fire drills leave a burning building in a surprisingly short time, while a disorganized mob may never leave it. The success of a military action depends both on fire power and on proper coordination of the units. Fire power is measurable in terms of energy units, but coordination is measurable in terms of something else: the rate of flow of information and the precision of timing in carrying out the sequence of necessary steps. Productivity of an industry depends on the amount of power available (energetics) but to no less extent on the skill of the workers (coordination of activity within the individual) and the skill of management (coordination of activity of the several workers). While it was traditionally assumed that these coordinating functions must be performed by "reasoning beings," i.e., men, it became gradually apparent that a great many of them could be performed automatically (by traffic lights instead of policemen, IBM machines instead of filing clerks, automatic steering mechanisms instead of helmsmen, electronic computers instead of human calculators). There arose then the intriguing idea that there may be a general "psychology" applicable both to the behavior of these devices and at least to certain aspects of human behavior.

NOW LET US pause for a moment and take stock of what we have said. Historically the technological analogies purporting to explain the behavior of living things have been geared to prevailing technological concepts. As technology became more involved, the analogies could be extended to more facets of behavior. We are now entering a new technological era—the era of "intelligent machines," called automata and servo-mechanisms. The understanding of the principles on which these machines are constructed and operate promises to extend our understanding of the living process still further.

We must, however, if we are to say something significant, indicate more specifically where that promise lies. We have two pieces of evidence in support of our rather optimistic view. The first is the tremendous stride forward in the understanding of the living process, which resulted from the previous discovery of just one far-reaching principle—that of transformation of energy. The second is the progress being currently made in the analysis of the vague teleological and vitalistic notions of "purpose" and "intelligence."

Let us recall, at the risk of becoming repetitious, why the understanding of the living process presents difficulties. Living things seem to differ from nonliving in three fundamental respects (immediately apparent to the naive observer).

1. They seem to be "autonomously" active (i.e., the motive power seems to come from the inside rather than be impressed from the outside as in the case of moving inanimate objects).
2. They seem to be guided by purpose and intelligence.
3. They maintain their integrity, grow, and reproduce.

The first technological analogy (with the clockwork) attempted to explain only the first of these characteristics and it did so very poorly. A clockwork is, to be sure, activated from the "inside" for a while, but there is no question about what the source of this activation is. The clockwork simply gives a *delayed* response to a stress (a push) impressed on it.

It is different with a heat engine. There is no obvious push there. The engine is *fed* in a very real sense and is activated by the food it "eats." The analogy to a living organism is in the case of a heat engine far from superficial. But the "muscular effort" of the engine is still externally directed. The locomotive is guided by the rails; the boat by the rudder. A simple engine is "told what to do" at every step of the process. Here the analogy with the living organism fails.

Now it is clear why the development of automata and servos naturally extends the analogy. The mechanisms of *control* are now built into the machine. We now want machines to behave "purposefully" and intelligently and since we have to design the machines, we have to analyze the notions of purposefulness and intelligence into component parts.

Really no sharp distinction can be drawn between intelligence and purposefulness. Any definition of one is sure to involve the other. Let me therefore describe very roughly the present status of "intelligence" and/or "purposefulness" in our machines which will then naturally lead me to the concluding remarks on the modern ideas of the nervous system. I view "intelligent" machines as consisting of two kinds, automata and servo-mechanisms. The only distinction I make between them is that the automaton is guided by a program of discrete steps or directions fed into it, while the servo-mechanism is guided by observing the effects of its action on the outside world. Thus a juke box which plays a number of selections in the order selected by the customer (in response to the buttons pushed) is an automaton, and so is an electronic computer. A target-seeking torpedo, on the other hand, or a gyroscope, I would call a servo-mechanism. Both exhibit "purposefulness" and "intelligence," although if we adhere to the intuitive popular meanings of these terms, the servo-mechanism seems to specialize in purposefulness and the automaton in intelligence. This seems so, because the automaton seems to be able to follow *explicit* directions, "When so and so, then so, unless so or so, in which case so . . ." (the program), while the servo seems to be guided by a goal. This difference is only apparent. To an outsider, the automaton may well seem to be guided by a "goal" ("Find the solution of this equation") while some one intimately familiar with the operation of a servo can describe its operation in terms of a program.

THIS equivalence of "program" and "goal" is the principal idea of the modern theories of the nervous system. One point must be kept in mind, however. Program and goal may be logically equivalent, but it does not by any

means mean that a description of an operation of an organism or a machine is equally convenient in terms of one or the other.

Let us take a trivial example. We wish a ball in a cup to "seek" to come to rest at a particular point. Here the desired behavior of the ball is described in terms of a "goal," and nothing is simpler than to design a device which will exhibit just such behavior. Take a cup of any convex shape and place it so that the desired point is the lowest. To describe the same kind of behavior in terms of a "program" would necessitate an infinite number of statements, each of which tells which way the ball is supposed to move if it finds itself in a particular position. Such a description in terms of discrete statements (an explicit program) is, of course, out of the question. A description of "intermediate complexity," however, can be given, namely, as a set of differential equations of motion which imply a stable equilibrium at the desired point.

Of the three descriptions clearly the first "stating the goal" of the ball is the simplest. What enables us to realize this "goal" by a mechanical device is our ability to see the problem as a whole. Similar considerations apply, I believe, to the theory of the nervous system.

The first attempt to account for gestalt phenomena in strictly behaviorist terms was made by McCulloch and Pitts in 1943. They showed that any pattern of behavior which could be described by *a program* was realizable in an automaton of a specified construction and (herein lies the importance of their idea) they gave an "algorithm" for the construction of the automaton based on the program. Automata, of course, operate on the same principle. The limitations of this approach, however, are immediately evident. The *whole difficulty* is to describe the action of the nervous system in terms of a program of discrete elementary steps.

The task looks more hopeful if "goal seeking" steps are allowed in the description of the program. If, for example, the construction of a mechanism for keeping a certain muscle tone constant is known, one of the directions in the program may read, "Plug in that mechanism." Thus with one stroke an immense number of elementary steps is "described."

The value of information theory in this approach to the nervous system is now apparent. The McCulloch-Pitts picture represents behavior in terms of firing patterns of individual neurons. With 10^{10} neurons in the human body, there are $2^{10^{10}}$ such possible patterns at each instant of quantized time. This number is utterly unthinkable. Nothing whatsoever can be said of a system with that many distinguishable states where nothing is known about how the states are to be classified.

To put it in another way, the amount of information per unit time needed to describe such a system is 10^{10} bits (the amount of information coming over an ordinary telegraph wire is considerably less than 5 bits per unit time). It is quite another matter, however, when sub-systems are "organized" to work in pre-

scribed ways, when touched off by proper signals. The *amount of organization* of such subassemblies *reduces* the amount of information necessary to transmit over the channels.

THIS consideration leads to two complementary conclusions. Rigidity of behavior in organisms requires smaller capacities of channels over which information flows. Contrariwise, greater channel capacities allow for greater flexibility of behavior.

We are thus led to ideas of the nervous system which involve not minute blueprint structures (a hopeless approach because of the tremendous complexity of the nervous system) but which involve over-all statistical concepts such as channel capacity, storage capacity, and other parameters familiar to the modern communication engineer, such as redundancy, signal-to-noise ratios, etc.

They are concepts analogous to the over-all concepts in terms of which the operation of the "muscle engines" is understood: power, efficiency, compression ratios, etc.

It is the development of the corresponding *over-all* concepts of communication and complexity which made intelligent machines possible and which gives us promise of future understanding of living behavior, particularly of the functions of the nervous system.

I need not, I hope, emphasize that none of these considerations are relevant to the question of whether thinking machines "really think." I admit I do not understand the question. The really pertinent question is whether similar *abstractions* can be utilized in both the theory of intelligent machines and in the theory of living behavior, particularly that governed by the nervous system.

We know that both organisms and machines receive, transmit, store, and utilize information. The question of how information is "utilized" is particularly interesting. We now know what food is used for: three things, namely, as a source of heat, a source of locomotive and chemical energy, and a source of materials for growth and restoring worn-out tissues. All these elements are being constantly dissipated by the organism: heat by conduction and radiation, energy by motion, materials through break down and excretion.

Can it be that besides energy in the form of food and sunlight, organisms also feed on something called "information," which serves to *restore the order,* which is constantly being dissipated in accordance with the Second Law of Thermodynamics?

The formal mathematical equivalence between entropy (the measure of disorder in a physical system) and information (as defined mathematically) was commented on by Shannon, Wiener, MacKay, and others. Can it be that this is no mere formal mathematical equivalence, such as obtains between an oscillating mechanical system and the analogous electrical one, but a more funda-

mental equivalence such as that between heat and energy or between energy and matter? Can it be that 1.98 calories per degree mole (the difference in entropy between two moles of two separated perfect gases and two moles of their mixture in equilibrium) is *actually* equivalent to 6.06×10^{23} bits of information—the amount it would take to separate the mixture into the constituent parts in terms of yes-no decisions?

If there is such a conversion factor, how do the information-receiving, information-transmitting, and information-storing organs operate to convert information into negative entropy or its concomitant "free energy" and, perhaps, vice versa?

THE INTRIGUING nature of these questions has stimulated some of us to undertake the study of communication nets from the information-theoretical point of view. This approach necessitates the description of such nets not in terms of detailed structure but rather in terms of gross statistical parameters. The flexibility and far-reaching adaptability of the behavior of higher organisms almost demands this sort of approach. Perhaps the most fundamental characteristic of living behavior as distinguished from that of man-designed machines is in the *sacrifice of precision* for safety. It is not important that a response be precise but rather that an equivalent response be given under a great variety of conditions or handicaps. It is more important to be "roughly" correct in practically every case than be "precisely" correct in every case but one and altogether wrong in that one. It is necessary to relate totally new situations *approximately* to situations already experienced, and it is necessary to leave certain portions of the nervous system "uncommitted," so that new behavior patterns to meet new situations can be organized. When machines are built possessing these characteristics, we may expect an even closer analogy to the workings of actual nervous systems. That the day is not far off can be inferred from the fact that mathematicians like von Neumann already do not shirk from theoretical investigations aimed at throwing light on the most typical of life processes—reproduction. I am referring to his recent calculations on the number of elements required in an automaton which can not only perform specific tasks assigned to it but also is able to reproduce itself, given a mixed-up aggregate of its elementary constituents. An actual materialization of such a machine would, of course, give startling reality to the prophecy in Butler's *Erewhon*.

Such is the state of the present studies, which are extensions of the technological analogies of the living process, particularly of the integrating functions of the nervous system. It is hoped that these studies are now approaching a level sufficiently sophisticated to yield enlightening and lasting results.

CONSCIOUS USE OF MODELS IN ETHICAL ANALYSIS

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IN HIS NOVEL *Darkness at Noon,* Arthur Koestler presents a prison dialogue between two Old Bolsheviks. The one, Ivanov, is the inquisitor of the other, Rubashov, who is to be charged with deviation into treason. Ivanov violently contrasts rival conceptions of ethics. "Consider for a moment," he says "what this humanitarian fog philosophy would lead to, if we were to take it literally; if we were to stick to the precept that the individual is sacrosanct, and that we must not treat human lives according to the rules of arithmetic. That would mean that a battalion commander may not sacrifice a patrolling party in order to save the regiment" . . . and so with other examples on to the conclusion, "The principle that the end justifies the means is and remains the only rule of political ethics." Ivanov boasts "We for the first time are consequent—considering only the consequences of what we do." "Yes," replies Rubashov "so consequent that in the interests of a just distribution of land we deliberately let die of starvation about five million farmers and their families in one year. So consequent were we in the liberation of human beings from the shackles of industrial exploitation that we sent about ten million people to do forced labor in the Arctic regions and the jungles of the East."

The debate which Koestler brilliantly presents both fascinates and horrifies. Ivanov's premises can scarcely be denied; his arguments seem compelling; and yet his conclusions are intolerable. Surely we must agree that sometimes it is not merely pardonable but morally imperative to tell lies to save a patient from demoralization or a public from panic: sometimes a commander ought to sacrifice a patrol to preserve a regiment, ought "to apply the laws of arithmetic to human beings"; sometimes it is a positive duty to assassinate a tyrant, to commit one murder to prevent perhaps a holocaust. Yet if once we admit these premises it seems as if we become logically committed to conceding to Ivanov his principle "that the end justifies the means is and remains the only rule of political ethics." But this principle is repellent: too much experience of our tormented age has shown where it may lead. Rubashov, who had led his whole

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life by it, was disillusioned in the end. But all the same he could find no arguments to stay the relentless logic of his inquisitors.

In the face of this, one is tempted to stop arguing with the Ivanovs—Communist or non- or anti-communist—for this principle is not a Communist prerogative—and to make it a matter of faith to reject it. But to do this, even without attempting to meet the arguments which purport to draw it as a conclusion from conceded premises, is a desperate and unsatisfactory expedient. Or, noticing what terrible results often seem to have followed from the application of the principle, one might be inclined to cut the Gordian knot by insisting that evil means can never as a matter of fact lead to good ends. But this is quite manifestly false. Perhaps it would have been a better world if such were to have been a Law of Nature. But it isn't. Just as it might have been better if it were to have been true, which again it isn't, that honesty is *always* the best paying policy, that virtue is *always* rewarded, that crime *never* pays. Then prudence could have replaced morality: the system would have been "so perfect that no one would need to be good" (Eliot). But it isn't.

Though these pious proverbs are often nearer the truth than the cynics would allow, still there is no reason to believe that they are universally true. They are, of course, truer in well than in ill governed states (but then that they should be nearly true in a state is a large part of what we mean by calling it well governed). But there is no reason for believing that they are everywhere and always wholly true. No reason, that is, outside some metaphysical faith which asserts and guarantees, in the face of no matter what appearances to the contrary, that the whole world is well governed, that there is, after all, some sort of moral order at the heart of the universe. Adding perhaps that a new world of a future life can be called in to redress the moral balance of this old world we know too well.

I WANT in this paper to see if anything can be done to meet the arguments of the Ivanovs without making any appeal to such a metaphysical faith. I shall do this by putting up a sort of defence in depth against the apparently irresistible logic of their onslaughts.

The basis of this strategy lies in the contention that all discussion of whether or not the end does or does not justify the means is necessarily conducted in terms of a particular model. This model may be inappropriate for various reasons; and, while none of these possible sources of inappropriateness holds in all instances, at least one of them will almost certainly apply in any given case. Hence the analogy of defence in depth, where what gets past one obstacle will probably be checked by another. Since this model will usually if not quite always be inappropriate for one or other of these reasons, it is quite unsuitable as the presupposition of any universal ethical principle. Hence it would be just as mistaken, though not perhaps quite so disastrous in its practical consequences, to

maintain that the end does not justify the means as it is to say that, on the contrary, it does.

This conception of the explanatory model, in terms of which we look at some group of phenomena and try to interpret and explain them, is one which is familiar and fundamental in the natural sciences, and in some other fields. But it rarely, if ever, becomes explicit in ethical discussion, although such models are certainly used here too. This is a dangerous situation. For if we are barely conscious or entirely unconscious that we are using models, we shall not be on the alert to make sure that we have the right ones. And a wrong model must necessarily distort our picture of the phenomena, leading us to formulate misguided questions and to debate issues we have misconceived. It will be like looking at the world through distorting contact lenses. We shall have to see all the facts forced into our unconscious matrix of misunderstanding.

NOW TALK of ends justifying or not justfying means, of achieving good ends by evil means, and so forth, presupposes that we are dealing with something analogous to a fieldgame in which the objective is unitary and given: and the problem is to find some way to reach it; or to select one or other of various alternative routes all of which lead to the same place.

This model may be inappropriate, first, because it suggests, or presupposes, that leading a moral life is exclusively or primarily a matter of achieving objectives; and that finding in any given situation what one ought to do is a matter of finding a way of achieving some objective. But this is usually wrong: to do one's duty, or to discover what it is, is rarely if ever a matter of achieving or finding a way to achieve objectives. It is rather to meet, or to find a way to meet, claims; and of course also to avoid misdemeanors. Promises have to be kept; debts to be paid; dependents to be looked after; honest work to be given to the employer who has bought our time; and stealing, lying and so forth have to be avoided. The man who does his duty is the man who meets these claims; and who does not commit these misdemeanors.

The second source of the inadequacy of this model in ethics is that it suggests or presupposes that the right thing to do is usually to strive to promote some positive good. Whereas surely what we should do is to fulfill obligations and to remove evils. If it is ever true that we ought positively to promote happiness, this is certainly always a much less urgent duty than those to prevent or to relieve misery. Morally, hospitals have priority over carnivals.

I WANT to say two things about this. Go back for a moment to the examples which Ivanov produced to justify his principle, those persuasive examples which it seemed impossible not to concede. It is easy, once we have become conscious of his model, and what it tends to suggest and to conceal, to see that they do not in fact support his principle. For they are uniformly examples not

of using evil means to achieve some greater good, but of preferring a lesser to a greater evil. We were prepared to agree with Ivanov that sometimes a commander ought to sacrifice a patrol—but to save a regiment; that sometimes it is a duty to lie—but to save a currency from the bears before devaluation; to save a patient from worry that might kill him; that sometimes it may be a duty (not merely in war but in peacetime) to murder a tyrant—but to prevent a holocaust. And we were so much the victims of an inappropriate model that we were misled to accept cases which were really instances of something else—the principle of accepting the lesser evil—as examples of quite a different one, one formulated in terms of that concealed but powerful model of the route or routes to an objective, the principle that the end justifies the means.

The second comment is that behind Ivanov's arguments is a whole approach to politics, what one might call (for all his cynicism about the masses, about men and their motives) a Utopian approach. I should like to contrast this with what I call a Reformist approach. The Utopian—Plato was the first Utopian—finds an ideal of what society should be and then looks for a way to achieve this ideal; thinking this and only this is the worthwhile political aim. The Reformist—Aristotle was the great protagonist of this approach—while perhaps cherishing an absolute ideal (as Aristotle did) is primarily concerned to secure piecemeal improvements to whatever sort of society we happen to have. The routes-to-an-objective, end-and-means model is what the Utopian wants, but won't do for the Reformist. To allow discussion to be conducted in terms of this model is to give the first round to the Utopians. But I shall not try to defend the Reformist as against the Utopian approach to politics, except perhaps to mention that some of the arguments against Ivanov's fundamental ethical principle are also arguments against Utopian politics; and to note that the road to Utopia too often seems to lead through Hell.

The third way in which the model may be inappropriate is that it presupposes that it is the same end which is reached by different means, as one may go to the same town by different routes or different methods: by road or across country; by bus or by train. Blinkered or fascinated by this analogy it is easy to overlook how limited is its application to the problems of ethics. Roughly speaking, the means you use affect the end you achieve; different roads lead to different places.

Three examples will bring out different aspects of this point. Leaders in war may rightly think that there are many strategies which would bring victory. It might seem that here at least, where it is so often applied, our model is applicable. But surely this is not so, for the situations which would be produced by the successful application of these alternative strategies, situations which would all be correctly called "Victory," might be radically different. If you read Chester Wilmot's *The Struggle for Europe*, you must have thought how very different the meaning of "victory" might have been if the West had had a different strategy. By pushing through the Balkans we might well have lost more lives in

winning and taken more time to do it. But we might thereby have got all Germany, Austria and Czechoslovakia into the hands of the West. The war was won but in another way; and so the Iron Curtain is nearer now than it might, perhaps, have been. The way you win a war helps to fix the situation after victory. History books, but not history, can be sliced into separate chapters.

A second aspect: while we must reject as a pious half truth the thesis that good ends cannot as a matter of fact be achieved by evil means, we may get some consolation from the fact that certain means cannot possibly lead to certain ends. At one time an ideological crusade to reform other people's politics might have been a reasonable and practicable proposition; even though it failed to fulfill the Church's criteria for a just war. But not now, surely. You may conceivably reform people's morals by edict; it is inconceivable that you should reform their politics by annihilation.

A third aspect: people and organizations are often affected by the things they do. In the end the reluctant inquisitor Ivanov of Koestler's *Darkness at Noon* may be transformed by the processes of corruption into the exultant inquisitor O'Brien of George Orwell's last appalling nightmare, *Nineteen Eighty-Four*. At the last this man can boast—I quote—"The Party seeks power entirely for its own sake. We are not interested in the good of others. We are interested solely in power . . . Power is not a means, it is an end . . . The object of persecution is persecution. The object of torture is torture. The object of power is power." Those who at first distastefully do wicked things for good ends may later come to relish the wicked means themselves. If you must: evil means tend to become evil ends.

The upshot is, I think, that this model of a road or roads leading to an objective will almost always be inappropriate in ethical problems, and therefore it is not possible to formulate any universal principle, positive or negative, in terms of it.

THIS WILL SEEM very negative and uninformative. For I have done nothing to tell anyone how in any particular situation he ought to act. But here I have not even been trying to do more than to show, in one extremely important case, how it is possible for our ethical thinking to be prejudiced and distorted by the unconscious acceptance of an inappropriate model.

Again, it may seem unsatisfactory to have met an unqualified universal principle, not with a rival universal principle, but with a series of limited and qualified generalizations. But that this is all that either should or can be done is, I think, fundamental in ethics; a sphere in which all generalizations have exceptions and have to be qualified according to time and place and circumstance,—except the generalization that in ethics there can be no principles without exceptions.

In our limitlessly complicated and permanently changing world there will

always be situations which provide exceptions to even the best of ethical rules; we have to decide in the particular case. Furthermore there will always be fresh moral problems to which no rule or set of rules will provide solutions ready made. Faced with these exceptional situations and these novel problems we can and should refer to guiding principles. But in the end every man has to make not merely deductions from or applications of the already given rules, but fresh decisions as to what is right; each man deciding for himself. And to do this, and to have to do this, is a part, and a large part, of what it is to be a man.

I have no wish here to give comfort to the bore who gets so much pleasure squelching discussions with his defiant "Define your terms." His maneuver results in shifting the burden in communication to the other fellow. Both must be brought into the act. We would have the listener work a bit, too. So we urge him to state his notion of what was being said. Incidentally, that bore may sometimes be routed with this: "What definition of my words do you have in mind? Perhaps we are thinking together after all."

The "plain-talk" and "say-it-in-simple words" teachers have been in vogue but they haven't been especially helpful. They, too, tend to put the emphasis on one side of the communication line. . . . We once observed eight meetings of a group of nine men . . . Five had taken one or more courses and had studied some of the books on "talking plainly." . . .

We were hardly prepared to find that four of the "plain-talk students" did the least amount of questioning, qualifying, inviting, etc. This may, of course, be an accident. . . . Nevertheless, *these particular men,* knowing the ways to "plainness" and using them, tended to think they had done enough when they spoke so. They seemed to focus attention on *their* talking. They made no comparable effort to look to the character of what they heard.

IRVING J. LEE, *How to Talk with People*

LANGUAGE AS COMMUNICATION: A FRAME OF REFERENCE

HERBERT HACKETT *

THE COMMUNICATION approach to the teaching of reading, writing, speaking, and related skills, as now developing in many colleges and universities, has its roots in many soils. Just what these sources are and the nature of the nourishment they provide, however, needs further study than that provided in such books as *Language in General Education* and *Communication in General Education*. Much of the total frame of reference is vague, unrecognized or undefined.

Progressive Education

ONE ROOT or set of roots is in the educational philosophy of John Dewey and its extension in the progressive education movement. Perhaps the most important contributions are the emphasis on the individual as the unit of attention and on the total situation as the unit of teaching. Corollary to this emphasis is the rejection of prescription (learning language by a set of rules rather than in use), the basing of standards of usage on cultural rather than historical or academic patterns, and the inter-relating of all course work in terms of the social behavior, including linguistic behavior, of the individual.

Cultural Anthropology

CULTURAL ANTHROPOLOGY has furnished a mass of data leading to a theory of language which is non-prescriptive and relative, which treats linguistic elements in a functional manner. The conclusion that language is a form of cultural behavior, to be understood only as behavior guided and limited by specific speech communities and operating within a total speech situation, is so generally accepted today that it is a constant surprise to find the teaching of absolute standards in grammar and usage, the setting off of language as a thing in itself, and the worship of the linguistic dogmas of Latin. Hundreds of anthropological studies make direct statements about the relative nature of language and this relative view has been translated into semantics, law, physics, economics, philosophy, indeed into almost every field. The effect of the relative approach on teachers of the communication skills has been largely indirect; they

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having taken the theory second-hand from other disciplines, especially semantics. Good general statements of the relative point of view can be found in Jespersen, Malinowski, Sapir, Bloomfield, Whorf, Cassirer, and D. D. Lee.

Operational Linguistics

A SECOND contribution made by anthropology is the emphasis on the functional or operational use of linguistic elements. The work of Malinowski is most important here and it has been widely adopted. The whole functional approach to the explanation of behavior has been questioned, it is true, but it makes a useful frame of reference which the semanticists and others have passed on to many teachers of communication skills. Bloomfield has formulated the S → r → s → R statement, where small *r* and *s* are verbal responses mediating between original stimuli and final responses. Some have talked about the tool nature of concepts and Bridgman in his *Logic of Modern Physics* discusses Einstein's "operational character of concepts." "The concept is synonymous with the corresponding set of operations" in contrast with Newton's absolutes such as "time"; the "true meaning of a term is to be found by observing what a man does with it, not what he says about it."

The cultural anthropologist, in defining functionalism, stresses the importance of the present, the interrelation of cultural facts, the importance of observation as the basis of classification, and the necessity of investigating alternatives to the norm. Malinowski, the most effective proponent of functionalism, says:

> In a fundamental pursuit of man, hunting for example, speech is the necessary means of communication . . . the one indispensable instrument for creating the ties of the moment without which unified social action is impossible . . . The structure of this linguistic material is inextricably dependent on the course of the activity in which the utterance is used. The vocabulary and meaning are no less subordinate to action.

Thus, language must be studied as a mode of behavior more than as a mere "mirror of reflective thought."

Lindesmith and Strauss, in their introductory text, *Social Psychology,* give a good example of the functional approach to definition:

> Since the term "self" is used as a noun, the existence of a corresponding entity or object seems to be implied . . . (this is) as erroneous as it would be to think of "speed" in the same manner. Both terms refer to events and relationships, rather than to entities having a definite location in space . . . The concept of self, if it is to be useful and valid, must be formulated as an organization of activity.

Functionalism has cross references to almost every other part of the present frame of reference, especially to progressive education, semantics, and to the "usage" school of linguistics.

A third contribution made by anthropology to linguistic theory is the now commonplace emphasis on speech as prior to and more important than written language in determining what language practice is. The result of this is best seen in the usage approach of Fries, Marckwardt and Pooley, discussed below.

Language and Individual Perception

POTENTIALLY ONE of the most fruitful theories to come out of anthropological studies of individual cultures is the effect of language on the individual's perception of the universe. According to this theory the grammatical categories and structural relationships of a language structure the universe differently for each language community. This theory, although in no way complete, is implicitly accepted by many teachers of language skills, is a part of the relative approach to knowledge which is the greatest contribution of twentieth-century science, and is closely related to most of the theory presented in this article.

It is supported by a mass of data, at least as far back as 1893, in Boas, Sapir, and Malinowski, to mention only three familiar names. Sapir states the theory clearly:

> Language is not merely a more or less systematic inventory of the various items of experience . . . but is also a self-contained, creative, symbolic organization, which not only refers to experience largely acquired without its help but actually defines experience for us by reason of formal completeness . . . because of our unconscious projection, implicit expectations into the field of experience . . . (meanings are) not so much discovered in experience as imposed upon it, because of the tyrannical hold linguistic form has imposed upon our orientation in the world.

The philosopher Hubert Alexander defines abstractions in terms of Sapir's theory as "situations torn from context and objectified" or as "only the frame of reference itself." "Logic grew up out of language" to reduce the relations indicated by linguistic propositions to consistency.

The most stimulating individual in anthropological linguistics in recent years is Benjamin Lee Whorf. He expands Sapir's theory in half a dozen articles. For example:

> . . . language is first of all a classification and arrangement of the stream of sensory experience which results in a certain world-order . . . not simply a technique of expression . . . (and) . . . does in a cruder but also a broader and more versatile way the same things that science does . . . The Hopi aspect-contrast . . . practically forces the Hopi to notice and observe vibratory phenomena, and furthermore encourages them to find names for and to classify such phenomena.

Some of the results of this structuring of the universe, Whorf points out, are reflected in our Western culture. Our linguistic habit leads to materialism, Newtonian physics, and a dualistic concept of nature, because we set up a form-

plus-substance dichotomy. Since we objectify time we are led to historicity, budgets, and planning for the future. Our grammatical structure encourages the cause-and-effect thinking which is the base of our science, religion and logic.

The full impact of this theory is, as yet, not fully recognized by teachers of skills. The semanticists have introduced it, and it has reached some teachers through philosophers such as Susanne Langer and certain physicists. Some structural linguists, such as C. F. Voegelin, have attacked it as based on misinformation or inadequate information about language. Their justified caution stems from the lack of supporting data for such a theory, but the fact remains that it is having a growing effect on the teaching of skills and our whole understanding of the nature of reality.

Traditional linguistics has undergone drastic changes under the influence of the anthropologist, although presently the structural linguists have little to offer in support of the present frame of reference. However, the cultural and behavioral linguists, whose work is sometimes called metalinguistics, are in substantial agreement with it. Almost every important work in general linguistics can be cited, including those of Jespersen, Sapir, Bloomfield, Cassirer and Sturtevant.

Semanticists as Middlemen

THE SEMANTICISTS may be considered as middlemen for the transmission of ideas from anthropology, sociology, psychology, biology, mathematics, and other disciplines, to the teacher of skills and others interested in language. Among the more useful for the non-specialist are Ogden and Richards, Hayakawa, Chisholm, Morris, and Johnson, although the levels of difficulty vary greatly. Their views, especially on the levels of abstraction, the nature of concepts and the non-Aristotelian method are too well known to need elaboration here. Norman Crowder (*ETC.*, Summer 1947) has applied some of these principles to the problem of classification in the social sciences and demonstrates that semantic theory can be translated into practice, easily and without suffering from the jargon of general semantics.

Similarly, the usage linguists have served to translate some of the theory of Jespersen, Sapir, and Bloomfield (among others) into practical terms; on the basis of observation they have attempted to define what the structure, categories, and norms of the English language really are. Most influential of the usage school is Fries, who has demonstrated that the grammatical categories of Latin are meaningless in current American usage and that many of the rules of prescriptive grammar are unrealistic in light of the practice of the best writers and speakers of the past and present. Leonard's *Current English Usage*, and Marckwardt and Walcott's *Facts About Current English Usage* are companion pieces which furnish important data about actual usage. Kennedy's *English Usage* furnishes a good bibliography and discussion of the views of linguists up to

1942. Perrin and Pooley have done the most to popularize the usage point of view.

The study of the development of language in the child has contributed much to the present frame of reference. Piaget, M. M. Lewis with his *Infant Speech: A Study of the Beginnings of Language*, and G. H. Mead represent different stages in the increasing knowledge in this area. Mead particularly is basic to any understanding of the frame of reference: language is the agency which makes possible the appearance of the self and permits the individual to be an object to itself; without language the universalization of the process of role-taking, the "generalized other," would be impossible. It follows, then, that language cannot be studied outside its social context, the "context of situation" of Malinowski.

TO SEPARATE the contributions of social psychology to the present theory of language from the contributions of other disciplines is difficult. Too long teachers of persuasion have dished out over-simplified formulae, imperfectly understood and dogmatically stated. As a prominent student of the psychology of attitudes once told me, "You people [speech teachers] act as if Dale Carnegie were a psychologist." The difficulty is that those interested in influencing people are looking for practical and simple answers to difficult problems, too lazy to undergo the discipline of either sociology or psychology and seemingly unaware that there are in these fields many frames of reference possible and that any answer is conditioned by the frame of reference and by each characteristic of the problem for which the answer is sought. There are no practical answers or formulae.

A most useful starting point is *Theory and Problems of Social Psychology* by Kretch and Crutchfield, which has the advantage of unity and which integrates much of the material discussed above.

THE EMPHASIS on the whole, on molar rather than molecular behavior, springs from gestalt psychologies and field theory in general. General education, the "communication skills" approach, and "functionalism" are all related to this concept of the whole. It is not necessary in accepting this approach to deny the explanatory value of such forces as habit, conditioning, imitation, and suggestion, but merely to ***emphasize*** the properties of the total, present psychological field as the most important factors in linguistic behavior and in the understanding of the nature and function of language. For other purposes other frames of reference, neo-Freudian, pure behaviorism, etc., may have some value.

A second emphasis is on the relation of needs and frustrations to the formation and changing of attitudes. For example, one important principle is: The greater the need for a socially valued object, the more marked will be the operation of behavioral determinants. This is first of all a matter of perception

and the necessity for changing perceptions in order to change attitudes, in part by relating these to the individual's perception of the larger structure of which they are a part. The literature on the development or changing of attitudes suggests that they are most easily changed when related to other attitudes and to existing values. One of the values present is status: language, to many, is a means of determining or attaining status. A second value to which any teaching or persuasive method can appeal is that of conformity to the group and its values; the experimental work of Lewin and his followers, the anthropological studies of primitive and modern societies, as for example *Street Corner Society* by Whyte, are important here.

Just as the process of perception discussed above is not to be separated from language, so processes of cognition are functions of communication. Cognition is the continuation of the perceptive process, its organization into meaning. To reorganize meaning, again to take one example, we have to take into account the differentiation (sharpness), isolation, and rigidity of the original meaning. How clear is the meaning, how closely tied to or dependent on other meanings, how rigidly held?

The contribution of the social-psychologist to our understanding of language can be endless; the difficulty is that, not being able to discipline ourselves as the social-psychologist must, we are willing to take watered-down or adulterated psychology.

IT WOULD BE possible to extend the present discussion to show how many other disciplines have contributed, or could contribute, to a theory of language and a teaching method. It has not been my intent to snub traditional linguistics, group dynamics, the mass media, mathematics, and philosophy, to name only the obvious omissions, but some of these disciplines have been so well discussed elsewhere and others have implications for our understanding of language behavior which are difficult to state clearly. Two excellent studies indicate some of these implications. *Language and Communication* by George Miller deals with many of the areas of interest to the present frame of reference, but his book is not integrated nor does it try to present a unified theory of language. John Carroll has just published *The Study of Language,* with a particularly fine account of the contributions of linguistics and psychology.

The following seem to be the more significant principles to be drawn from the above discussion; perhaps they will suggest a framework, however preliminary, for the teaching of skills and for a greater understanding of language:

1. Language is behavior and must be taught on behavioral principles. To this degree the study of language is a social science.

2. As behavior, language must be considered within the whole context of situation, including linguistic context, which accompanies the behavior. There is no such thing as writing, only writing for particular audiences, in particular

situations, for particular ends. The measure is effectiveness in terms of purpose.

3. Language is first of all a functioning tool of interaction and rarely a means of reflective thought; as such it has no meaning apart from behavior; meaning is context.

4. As behavior it must adapt to the situation, the user, the audience, the subject matter, and the end for which it is used.

5. As behavior it must be studied in terms of group norms, the expectations of the group as to usage, content, and purpose. These expectations of the group must be discovered by observation; they cannot be prescribed by arbitrary decisions about correctness.

6. The rules of grammar and the classifications of language cannot be drawn from classical or other sources outside the culture. Therefore, language cannot be taught prescriptively, since the prescription may fail to keep up with the actual practice in a culture. The student must be taught to observe usage and to fit his communication to accepted good usage.

7. The individual must learn to observe language behavior, including his own, so that he will be conscious of differences demanded by different situations. He must be made aware of a variety of good models to guide him in different situations.

8. The unit of writing or speech is not the part—the word, sentence or paragraph—but is the total perception to be transmitted. Thus the approach to the learning of skills is through the perception of the whole, subject and purpose, audience and occasion; grammatical and structural units should be considered only as they aid or hinder the total expression.

9. The end of language is not language but the communication of content, leading to better perception by the reader or audience. Writing, for example, will be first concerned with what is said; how it is said will develop from this.

10. The emphasis must be on clarity, accuracy, and interest, for a particular audience. Grammatical correctness is merely one means to these ends.

11. Language as behavior has a social responsibility, including proper recognition of bias, accurate use of data, and a positive acceptance of the opinions of others and the relativity of knowledge.

In summary, I can do no better than to quote Frederic Reeve:

> Good communication is that which is meaningful, effective, socially acceptable, and socially responsible. Communication is meaningful when it results from an awareness, conscious or unconscious, of the signs of structural meaning (grammatical form and structure); it is meaningful when it is clear, accurate, unambiguous in word choice and arrangement, and when it is organized in terms of purpose and intention. Communication is effective when it is simple, forthright and specific, and when it is appropriate to the user, the subject and the situation in intention, tone, level of usage and organization. Communication is socially acceptable when it is

free from readily determinable illiteracies, and when it is characterized by observation of current linguistic conventions which are validated by the practice of educated writers and speakers. Communication is socially responsible when it is grounded in observable fact, in honestly contrived opinion, in an awareness of personal and social bias, and when it contributes to understanding and harmony among the greatest number in a democratic society.

Like any definition, this one has relevance only as it works. Its frame of reference, also, is relative and must be changing. It is neither right nor wrong; it may be useful.

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Theorems are imaginary figures with contours of geometrical neatness. But reality never exactly coincides with theorems. And yet there is no other manner of understanding reality than to fit, as best we can, its perpetually shifting shapes into such prefabricated molds as our imagination produces. Theorems allow us to take our bearings in the chaos of reality. They may even supply the means to determine the discrepancy between reality and the cobweb of our ideas. Thinking is an ironical operation. It enables us to ascertain the "pure truth." But it also reveals that facts never quite conform; for facts are the impure truth.

JOSE ORTEGA Y GASSET, *Concord and Liberty*

✡ DISCUSSION ✡

THE MOUNTAIN WITH THE WRONG NAME

WILLIAM R. CATTON, JR.*

A FUNDAMENTAL tenet of general semantics is the denial that a *necessary* connection exists between symbols and their referents. But when we say "the word is not the thing," even the avid student of Korzybski, Hayakawa, Rapoport, Lee, etc., may feel this is true but trivial. The series of events described below clearly indicates that *to the people who fall victim to this type of misevaluation it does not appear trivial.*

Referring to "the most majestic and imposing mountain in the United States," one of these persons asserted that it "should bear a worthy name and the name it should bear is a subject that may well claim the attention of the Nation's Congress." [1] The name for the highest peak in the Cascades *did* claim the attention of Congress at one time, after more than a generation of passionate and semantically naive controversy in the Puget Sound area.

In 1868, Morton M. McCarver, after founding communities in Iowa, Oregon, and California, travelled to western Washington to found a city on the site of the probable western terminus of the Northern Pacific railroad. Though not connected with the railroad, the location of its terminus was the primary consideration in McCarver's selection of a townsite.[2] He placed his bets on an area adjacent to Commencement Bay, and named his town "Commencement City." Another name was almost immediately suggested to McCarver by a visitor who had just read Theodore Winthrop's *Canoe and Saddle* and liked the word "Tacoma" which Winthrop had said was an Indian word for "snow peak" and had applied to Mt. Rainier.[3] McCarver adopted the name for his city.

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[1] A. H. Denman, *The Name of Mt. Tacoma* (Tacoma, Wash.: Rotary, Kiwanis, Lions, and Gyro clubs, 1924), p. 4.

[2] Historical Statement by Victor J. Farrar before the United States Geographic Board, May 2, 1917, contained in C. T. Conover's published testimony before the board in the matter of the *Proposal to Change the Name of Mt. Rainier* (Washington: U. S. Gov't Printing Office, 1917), p. 46.

[3] *Ibid.*

The president of the Tacoma Land Company in the early 1880's, Charles B. Wright of Philadelphia, was also a powerful director of the Northern Pacific. He succeeded in getting Tacoma declared the western terminus of his young railroad.[4] In March, 1883, the Northern Pacific's *Northwest Magazine* (published in the east) casually announced that: "The Indian name Tacoma will hereafter be used in the . . . publications of the Northern Pacific Railroad . . . instead of Rainier, which the English Captain Vancouver gave to this magnificent peak when he explored the waters of Puget Sound in the last century." The mountain was known by the name Rainier "to all the early settlers up to the time of the completion of the Northern Pacific Railroad to Tacoma. The railroad company then renamed the mountain after the city . . ." [5]

"Mt. Rainier" was officially adopted as the name of the mountain in 1890, however, by the U. S. Geographic Board, and after this decision even the Northern Pacific abandoned the term "Mt. Tacoma" in its literature. When, in 1916, a delegation of Tacoma residents protested this acquiesence, the railroad's general passenger agent said: "Gentlemen, we have carried this farce as far as we are going to for advertising purposes. The name has been officially declared to be Rainier, and that is what we shall call it. You can call it what you please." [6]

Prior to attainment of statehood by Washington Territory in 1889, Tacoma propagandists had urged adoption of their city's name as the name for the new state.[7] Failing this, three delegations from Tacoma journeyed to the nation's capital during the next two generations for the purpose of persuading the U. S. Geographic Board to adopt the name of their city as the official name for the mountain.[8]

INTEREST in the mountain's name had reached such a level by 1915 that even religious bodies were taking official action. The Seattle and Tacoma Associations of Congregational Churches adopted a resolution in which they affirmed that they were "deeply concerned in binding together in close bonds of friendship and fraternity the communities of Western Washington and further, we declare that the time has fully come for the two cities to unite in one historic name for the mountain . . . [so] we petition the Geographic Board of the United

[4] Letter from John Muir, former traffic manager of Northern Pacific Railway Co. to C. T. Conover, published as an addendum to the latter's testimony, Conover, *op. cit.*, p. 70.

[5] *Ibid.*, p. 23, quoting from Ellwood Evans (an eminent Tacoma lawyer and historian), *History of the Pacific Northwest* (Portland, 1889), vol. 2, p. 153.

[6] Statement by Dr. C. Hart Merriam, a member of the United States Geographic Board, before that body, May 11, 1917, reprinted in Conover, *op. cit.*, pp. 62-3.

[7] Conover, *op. cit.*, p. 13.

[8] Hearings before the Committee on the Public Lands, House of Representatives, Sixty-Eighth Congress, Second Session, on S. J. Res. 64, *Changing the Name of Mount Rainier* (Washington: U. S. Gov't Printing Office, Jan. 9, 1925), p. 5.

States to give to the mountain the name by which it was called by the aborigines." [9]

In 1916, following agitation by the Tacoma *Times,* a mass meeting was held and a "Justice to the Mountain Committee" was formed. The mayor of Tacoma and sixteen other prominent business and professional men were on the committee, which began a systematic campaign of speeches, leaflets, etc., addressed especially to the people of Seattle.[10] By the end of February, 1917, the committee had succeeded in securing passage by both houses of the State legislature of a memorial to the Geographic Board. The Geographic Board responded by holding public hearings on May 2, 1917, concerning the suggested name change. On May 11, the board "declined to reconsider its former action establishing the name Rainier for the mountain." [11]

Resolutions were introduced in both houses of the sixty-eighth Congress in the hope of achieving what the petition to the Geographic Board had failed to accomplish. The House resolution died in committee, but the Senate version passed the Senate on April 21, 1924. Its content should be of interest to general semanticists: [12]

> JOINT RESOLUTION To change the name of "Mount Rainier" to "Mount Tacoma" . . .
>
> Whereas it is the universal practice, out of respect for the American Indian, to perpetuate, wherever possible, in the geographical nomenclature of the United States the names used by the American Indians; and
>
> Whereas the man for whom Mount Rainier was named, as the commander of a British ship, engaged in depradations along the Atlantic Seaboard in armed opposition to the government of the United States; and
>
> Whereas perpetuating the name "Rainier" is contrary to the wishes of the sovereign State of Washington, as expressed in a memorial passed by the legislature of said State in the session of 1917 . . . Therefore be it
>
> Resolved by the Senate and House of Representatives of the United States of America in Congress assembled, That from and after the passage of this resolution the mountain heretofore known as "Mount Rainier" . . . shall be known and designated on the public records as "Mount Tacoma" . . .

In the House, this Senate resolution was referred to the Committee on Public Lands, which held hearings on it, but did not report it back to the House before Congress adjourned. With the resolution's death in committee the formal social movement ended, but one still hears the name "Mt. Tacoma" when one converses with friends from the city of Tacoma, some of whom earnestly assert that this is the mountain's "real" name.

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[9] Justice to the Mountain Committee, *Brief Submitted to the United States Geographic Board* (Tacoma, Wash., 1917), p. 64.

[10] *Ibid.,* pp. 65-6.

[11] Conover, *op. cit.,* p. 68.

[12] Senate Joint Resolution 64, Sixty-eighth Congress, first session.

Oddly, some of the Indians who lived within sight of the peak seemed not to know its "real" name. The names "Puskehouse," "Tiswauk," and "Tuahku" were used by various tribes in the vicinity to designate Mt. Rainier.[13] Dr. C. M. Buchanan, for 25 years superintendent of the Tulalip Indian Reservation in Washington, and an authority on Indian languages, wrote in 1908: "I do not believe the word 'Tacoma' is known to any of the native tribes of the Puget Sound region as, generically, a genuine Indian word of this region. . . . My own opinion is that Winthrop [who first used] the written word 'Tacoma' with a local application, . . . probably confused the better known Algonquian word with the word used exclusively for Mount Baker ['Tah-hoh-mah']." [14]

SOME CONSIDERATION of the arguments advanced on both sides is instructive for general semanticists. Proponents of "Mt. Tacoma" urged that name's adoption on the ground that [15]

> Aboriginal names for great natural objects are nearly always appropriate because they are applied with sincerity and directness indicating the feeling inspired in the natural mind. . . . *Such names become in our mind a part of the nature of the mountains and places they designate* and should be treasured as a valuable possession. . . . [my italics]

The assertion by Angeline, daughter of Chief Seattle, that "God named the mountain 'Tacobet,' and only He could change it," was cited in all seriousness as evidence on behalf of the name "Mt. Tacoma." [16]

Statements and actions by various learned societies were also cited, including a list of conclusions formulated by the Tacoma Academy of Science in February, 1893, which read in part: [17]

> (1) The Puget Sound Indian name for the mountain is 'Ta-co-bet' . . .
> (2) The Yakima-Klickitat name is 'Ta-cho-ma' . . . frequently written as 'Ta-ho-ma.'
> (3) The name means 'snow-covered mountain.'
> (4) The word 'Tacoma' is a fair, honest Indian noun.
> (5) The word 'Tacoma' should be preserved as the name of this royal mountain peak, and 'Mount Rainer' should be abandoned.

In reporting that the American Scenic and Historic Preservation Society had endorsed the name Tacoma by unanimous vote of its trustees in 1921, one proponent of the name-change felt compelled to add: "This organization has its offices in the Tribune Building in New York City. It includes most noted geographers, historians, and other men of science. It had the patronage of the

[13] Historical Statement by Farrar, in Conover, *op. cit.*, p. 52.
[14] Conover, *op. cit.*, p. 18.
[15] Denman, *op. cit.*, pp. 4-5.
[16] *Ibid.*, pp. 32-3.
[17] *Ibid.*, pp. 36-7.

late J. Pierpont Morgan who was its honorary president, and has the support of Mrs. Edward H. Harriman." [18]

PRESIDENT TAFT was alleged to have "on more than one occasion in public speeches during his incumbency declared his preference for the Indian name Tacoma . . ." Theodore Roosevelt was quoted as saying, "Why should we Americans abandon the splendid Indian name 'Tacoma' in order to call our noblest landmark after a foreigner whose only connection with our history is that he fought against us when we were an infant nation?" [19]

Against arguments of this sort, an editorial in the Seattle *Post-Intelligencer*, April 21, 1917, pointed out, "It is, of course, possible to decree that henceforth the name of the mountain shall be 'Mount Tacoma,' or 'Mount Somethingelse.' But no decree can make people use the name. It will still be 'Mount Rainier' in speech and in written word." [20]

The U. S. Geographic Board, in a report to the Senate Committee on Public Lands and Surveys, provided the chief argument for keeping the name "Mt. Rainier"—a quantitative comparison of the frequency of usage of the two rival names. The board had examined the relevant literature and reported as follows: [21]

> (1) Apart from documents and folders treating of or emanating from the city of Tacoma more than 90 per cent use the name "Mount Rainier" exclusively.
>
> (2) In the bibliography of Washington Geology and Geography, published by the State of Washington in 1913, 47 publications on Mount Rainier are enumerated, 46 of which use the name "Rainier," and 1 the name "Tacoma."

THERE IS some evidence to suggest that proponents of the name change were motivated in part at least by resentment, which would have prevented them from recognizing the futility of their endeavors. One of their leaders argued for the right of the first successful climbers of the volcano to name it. (The climbers had called it "Tacoma.") He says, "they applied to the mountain the name they obtained from the Indians without thought of booming any city or promoting their own vanity or flattering or purchasing favor of any individual or doing anything else than applying to the object of their attainment a worthy and appropriate name of fine significance." He attributed persistence of the name "Rainier" to Seattle's alleged jealousy of Tacoma when the latter was

[18] *Ibid.*, pp. 76-7.

[19] *Ibid.*, p. 83.

[20] Quoted in Hearings . . . on *Changing the Name of Mount Rainier*, p. 7. The proposal by a British newspaper following the conquest of Mt. Everest that the name of that peak be changed to Mt. Elizabeth will, in all probability, be defeated by usage also.

[21] *Ibid.*

chosen by the Northern Pacific as its terminus. When Washington became a state, one of its first Senators was Watson C. Squire, a wealthy Seattle resident. "Senator Squire," this Tacoman asserts, "induced the Board of Geographical Names to adopt the name 'Rainier'." [22]

The resentment motivation is further suggested by the charge that this name "has never been fully established and never will be. Nothing but arbitrary bureaucratic regulation and a mean jealousy . . . sustains it . . ." [23] But such "bureaucratic regulation" sounds pretty gentle in view of the Geographic Board's statement to the Senate Committee: "If it shall be the desire of Congress to change the name of the mountain . . . the department can have no objection." [24]

Resentment was apparently not confined to the Tacoma side of the battle. The Geographic Board bitterly objected to the accusation that it "rendered its first decision for the perpetuation of the established name as a return for a carload of Rainier beer, the obvious fact being that the date of the decision (1890) was four years previous to the appearance of the beverage in question." [25] When the writer telephoned the brewery in Seattle, however, this "obvious fact" turned out to be an error; Rainier beer has been on the market since 1878 (and always under the name "Rainier"). In Tacoma the rumor that the mountain's name was preserved merely to advertise the beer still circulates.

IT WOULD be gratifying to be able to report in conclusion that such groups as the Mountaineers, whom we might expect in view of their intimate contact with the mountain to be more extensionally oriented than other persons, had avoided involvement in this controversy. However, while the Mountaineers seem to have taken no action as a group, several of the most outspoken individual advocates of the name change were members of that club. Apparently Mountaineer_1 is not Mountaineer_2, etc.

And so a naive but righteously indignant movement subsided, having accomplished nothing except to aggravate and perpetuate certain local animosities, and perhaps to prove, incidentally, that the universe is not administered according to the rules of poetic justice. For if it were, *The Mountain,* which somehow managed to remain aloof from all this, might well have given a more active demonstration of its supreme indifference to men's appellations for it, awakened from its long dormancy, and casually blotted out the disputants.

[22] Denman, *op. cit.,* p. 24.
[23] *Ibid.,* pp. 84-5.
[24] Senate Report No. 268, Sixty-eighth Congress, first session.
[25] Hearings . . . on *Changing the Name of Mount Rainier,* p. 6.

THE MASK OF NIGHT

DORIS B. GAREY *

SOME YEARS AGO, a Shakespeare class at Fisk University was given an examination containing a number of passages to be identified and discussed, among them Juliet's lines:

> Thou know'st the mask of night is on my face,
> Else would a maiden blush bepaint my cheek
> For that which thou hast heard me speak tonight. . . .

One young woman attributed this passage to Othello—obviously her attention had been so riveted by the first line that she had not considered how inappropriate it would be, even on other grounds than complexion, to associate "maiden blushes" with the Moor.

Two things about this little incident struck me with considerable force. The first was the uncanny poetic appositeness of the phrase "the mask of night," taken in isolation, to describe certain aspects of the relationship between races. There are, of course, a number of different masks. The Caucasian newly arrived in a predominantly Negro environment may be appalled to learn that he too is wearing a mask—a fact which he will learn the first time a Negro with whom he is unacquainted throws him a glance of ill-veiled hatred. He then realizes, as he could realize in no other way, the sensation of the mask which is doubtless a permanent part of the experience of darker people in American society. He experiences the truth of what Ralph Ellison has communicated so effectively: that these masks often serve to render us invisible to one another. And—on the happier side—he experiences a sense of profound relief and relaxation when the masks suddenly become transparent.

But the second thing which struck me was that these masks might be thought of as having, at the present, eye-holes covered with different sorts of glass, so that the persons looking *out,* as well as the people looking *on,* get different views. In all probability the association of "the mask of night" with Othello would never have occurred to a Caucasian student. And this raises the interesting and important question: how far does one's own mask influence his reactions to what he reads? For instance—to choose another example from *Romeo and Juliet*—one might question how differently-masked persons would react to:

> It seems she hangs upon the cheek of night
> Like a rich jewel in an Ethiop's ear.

One would guess that the individual in a Caucasian mask, unless he were the victim of violent prejudice, might delight in the purely esthetic effect. But

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how about the person in an "Ethiopian" mask? Would he be likely to share the same disinterested esthetic experience?

OF COURSE in one sense there is nothing in the least new about these questions. We are all aware that our own individual, as well as group, experiences influence our reactions to what we read. The racial-mask question, therefore, is only one example of a broader one; but it seems to me none the less important for all that.

I hasten to add that I think its importance can easily be exaggerated. The great majority of native Americans, whatever their masks, are products of a predominantly Anglo-Saxon culture. The American Negro student, for example, is not likely to think of Africa as "home," and his ideas about it may be quite as weird as those of the young Caucasian. One African student at Fisk testified that his American schoolmates had a vague notion that his house might be regularly invaded by wild animals and that he might be personally acquainted with Tarzan. And on the whole I have not found that the reactions of Negro students to Anglo-American literature differ markedly from those of Caucasian students. In responding to *Pride and Prejudice* or *King Lear* they are not troubled by the thought that the characters wear a different mask from their own. Pope's *Essay on Man* seems remote to them—and equally remote to their Caucasian counterparts.

The occasions when a difference arises, however, are none the less significant. I shall ignore those literary works which deal specifically with racial themes, for they pose a special problem. Instead, I shall mention a few examples of other kinds. When a group of Fisk students were considering Vachel Lindsay's tribute to John P. Altgeld, "Sleep softly, eagle forgotten," they paused at the line, "A hundred white eagles have risen, the sons of your sons." "How about those *white* eagles?" someone inquired with a good deal of suspicion. It was easy for the instructor to explain that "white" here had a quite different connotation, and to mention the famous chapter in *Moby Dick* where Melville explores the curious ambiguities in the symbolism of "white." Yet the fact that the question had arisen in the first place undeniably created somewhat of a barrier which perhaps was not altogether swept away by the explanation. In another context, a student remarked on the importance of a poet's suggesting an emotional reaction instead of describing it too specifically. "For example," she said, "if a poet describes a beautiful lady by talking about her golden hair and blue eyes, the effect is too limited. But if he says, 'My love's like a red, red rose,' you can fill in the details for yourself."

Then there are the less tangible cases in which a generalized parochialism offers a stumbling block. This difficulty does not arise with a novel like *Pride and Prejudice,* where the parochialism would be equally apparent and as a rule equally entertaining to Negro and Caucasian readers alike. And of course it

would not arise with *King Lear,* which is not parochial at all. It arises primarily with works in which the author seems to be laying claim to universality and yet betrays indirectly that he has in view only a Caucasian world and a Caucasian group of readers.

ALTHOUGH for the most part I am not now concerned with writings which deal specifically with "racial" themes, a passage which does at least touch on a theme of this kind will provide a curious illustration of how complex the whole matter is. A group of Fisk students were considering this passage from Bertrand Russell:

> In order to be happy we require all sorts of supports to our self-esteem. . . . We are white, and therefore God cursed Ham and his descendants who were black. We are Protestant or Catholic, as the case may be, therefore Catholics or Protestants, as the case may be, are an abomination. We are male, and therefore women are unreasonable; or female, and therefore men are brutes. We are Easterners, and therefore the West is wild and wooly; or Westerners, and therefore the East is effete. We work with our brains, and therefore it is the educated classes that are important; or we work with our hands, and therefore manual labor alone gives dignity.[1]

Despite the fact that the conscious purpose of the passage is to *combat* parochialism, the class displayed signs of sardonic dissatisfaction (in this case unverbalized). A little scrutiny suggests the reason. One would have grounds for supposing that Russell envisaged his audience as comprising both Protestants and Catholics, both men and women, both Easterners and Westerners, both workers with hand and workers with brain—but not both Negro and Caucasian. The difficulty could probably have been eliminated if he had introduced a sentence beginning: "Or we are black, and therefore . . ." Note that this would have involved making a criticism of parochial tendencies in the Negro group; but in this case the criticism would have been an advantage, for it would have included the Negro group in the "we." It would have put the Negro, like everyone else, on the giving as well as on the receiving end of "broad-mindedness."

WE CANNOT very well revise the works of the past with a view to eliminating the sorts of difficulty I have indicated; but we might suggest that writers—especially, perhaps, Caucasian writers—should take cognizance of it. Quite clearly, the problem cannot be met by a mere mechanical censorship or self-censorship aimed at avoiding any possible offence to people who wear other masks than our own. Such anxiety might easily result in a kind of self-consciousness which would seriously block artistic expression. Or it might produce the state of mind of the small boy who had been over-indoctrinated with the idea that he must not talk in church. "Mother," he suddenly announced in a

[1] Bertrand Russell, *Unpopular Essays* (N.Y.: Simon and Schuster, 1950), p. 160.

tone of horror, "I'm talking out loud *again*. And now I'm doing it *again*." In any event, this undue caution seems a kind of indirect insult to the very groups whose allegedly sensitive feelings it is designed to spare. Until we take for granted that people wearing other masks than our own are as willing as ourselves to accept candor and criticism, we are not really regarding them as equals.

What I have in mind is an attitude which should do more to liberate than to stultify full intellectual and artistic expression. The serious writer of our own day does not aim directly at a "mass" audience, as does the average movie producer or the manufacturer of pulp fiction and Edgar Guest lyrics. Most of us who are genuinely interested in literature would not want him to do so. On the other hand, it seems reasonable to suppose that he wishes to reach a considerable body of readers who do not already share his view of life. If he cannot enrich their experience, there would be no point in his publishing at all. Is it not a challenge to him to consider how he can make his own experience or attitudes "real" to many who differ from him? And may he not find a special challenge in a vivid realization of the fact that people behind masks of many different hues are now quite able to read—and to think and feel maturely? If he is intelligent and non-sentimental in his recognition of this fact, he may become a major influence in hastening the day when the masks will not matter to anyone.

NOTES ON THE LIMITATIONS OF LANGUAGE

ELIHU FEIN *

THE INCREASING abstractness of physics makes the task of translating the mathematics in which physical theories are phrased into ordinary language increasingly difficult. In the present century, this difficulty has grown so formidable that some are inclined to doubt the possibility of giving an ordinary language interpretation to the contemporary vocabulary of mathematical signs. It is even held that the kind of understanding we might get from ordinary language is unnecessary now that physics has mastered the powerful language of mathematics —that the demand for translation of the analytical symbols may definitely hinder analytical thinking.

It is difficult to translate from mathematics to words because words have not only conscious but unconscious meaning. Mathematics, on the other hand, as a logical, intellectual structure, has only conscious meaning. Thus, mathematics is free from those unconscious associations words have which may be detrimental to understanding the physical world.

Consider the word "force" and the symbol F as it is used in Newton's

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Second Law: $F \sim a$ (force is proportional to acceleration). "Force" is a term of aggression. When force is applied successfully between men, behavior will be altered in conformity with the will of the applier, presumably against the will of another. If the symbol F is to be translated into this anthropomorphic concept "force," it must follow, implicitly at least, that the interaction of objects is the application of the will of one over the will of the other suffering some change in its behavior.[1] On the basis of these unconscious assumptions, one is likely to ask further questions. If an object is observed to be accelerating, and the F associated with the acceleration is translated into the common sense term "force" with its associated connotations, one is likely to ask, "Who is the 'master' of this object? What 'will' is determining the behavior of this 'weaker' thing, etc.?" If the object is attached to a string, one will look for the hand at the other end. But there may be no string. How then is the "will of the master" communicated? In order for F to be identified with "force," there must be a medium through which the force is transmitted, and so to keep this identity in the case of non-contact forces (e.g., gravitation). Physicists were once persuaded to postulate an "ether," the universal medium over which forces were supposed to be transmitted and which in terms of more rigorous analysis turned out to have no meaning at all.

RELATIVITY THEORY finally showed the inequivalence of F and force by changing its perspective from a dynamic to a geometric frame of reference. As a geometric theory, relativity can be more "accepting" of phenomena than dynamics, because relativity theory has no need of the concept "force." In translating newtonian mechanics into everyday language, it was natural to interpret the behavior of a body changing the direction of its motion as follows: the body "wants" to go in a straight line but is prevented from doing so by the force acting upon it, i.e., the straight line is the most preferred line of motion. Relativity theory, on the other hand, does not blame "forces" for frustrating the preferences of moving objects. It argues that the preferred path is a consequence of the geometry of the region in which the body finds itself and that this preferred path is always chosen. Anthropomorphically speaking, relativity theory is more "permissive" than the newtonian.

Relativity theory combines the three-dimensional space and the one-dimensional time of newtonian mechanics into a four-dimensional continuum, which is, moreover non-euclidean in the neighborhood of matter. This means that in the neighborhood of matter the preferred paths (which are always the shortest) are *not* straight lines. For example, near the earth's surface the path of a projectile should be a parabola, because it is the shortest path in the space-time continuum, not because the earth's gravitational force "forces" the projectile to

[1] For further discussion of this point, see Anatol Rapoport's "Newtonian Physics and Aviation Cadets," *ETC.*, I (1944), 154-164.

depart from its preferred path, which is always a straight line.[2] Calling non-euclidean space euclidean necessitated the symbol *F* and its identification with "force."

The difficulty with the word "force" as a translation for *F* is inevitable, because words express man's inner preferences, and one of these preferences seems to be for a space that is euclidan. While successful mathematical symbols may be abstracted from the verbal language (in the case of *F*, it is only partially successful), these symbols can transcend the limitations of the words from which they grew. In turn, new mathematical symbols are not wholly translatable into words and the extra intelligence which they contain cannot, in general, affect our essential prespectives. Thus the insights derived from relativity theory (that space is non-euclidean, time non-transcendent, *F* only relative) cannot be expected to be wholly adequate translations of the mathematical intelligence of this theory. Though these insights do indicate the errors of some of our inner preferences, they do not constitute a sufficient experience to alter our nature so that the concepts of non-euclidean space could satisfy us.

WE DRAW the conclusion that because the symbols of mathematical physics are never entirely translatable into words, as the analysis becomes more penetrating and profound, the separation of words and symbols will increase. This means that inevitably the advancing analytical (mathematical) knowledge becomes less satisfying emotionally, for only words through their unconscious associations (absent from mathematics) can be psychologically satisfying.

There is one situation in which spatial prejudice and reality will coincide, where the word-picture of three-dimensional space will be correct. In a space ship, far from the earth and other celestial bodies, space will be approximately euclidean. Here the preferred path of a projectile will be a straight line. A man in such a space ship should experience relief from the pretense that earth-bound space is euclidean. He would not have to defend his belief that space is euclidean by accusing gravitational force of interfering with his projectiles deviating from their "natural" paths. At last achieving his ideal geometry, this man might be completely relaxed.

It is possible, however, that the verbal language, which expresses not only man's preference for euclidean geometry but also makes provision for its defense (e.g., the word "force") might not quite be able at first to realize the new experience. How long it would take a man in a space ship to adjust would probably depend upon his naiveté; a relativist might have an easier time of it. But for any man some period of adjustment would be necessary.

[2] The idea that force represents the discrepancy between the natural geometry of a coordinate system and the abstract geometry abritrarily ascribed to it is discussed by A. S. Eddington in *The Mathematical Theory of Relativity* (Cambridge: The University Press, 1924).

It is further possible that the operations of the rocket may make too strong demand upon the man's earth-bound (gravitational) perspective. His bodily coordination, for one thing, would have to adapt itself to the non-gravitational experience. If he were to throw a tool to a companion, he would miss until he learned that the tool would fly in a straight line, not in a parabola. This non-gravitational experience will be accepted by him only when he learns that he need not here defend his belief that space is euclidean, and that his word-picture of space does correspond with the reality of his space.

He [the student of politics] must also be on his guard against the old words, for the words persist when the reality that lay behind them has changed. It is inherent in our intellectual activity that we seek to imprison reality in our description of it. Soon, long before we realize it, it is we who become the prisoners of the description. From that point on, our ideas degenerate into a kind of folklore which we pass to each other, fondly thinking we are still talking of the reality around us.

Thus we talk of free enterprise, of capitalist society, of the rights of free association, of parliamentary government, as though all of these words stand for the same things they formerly did. Social institutions are what they do, not necessarily what we say they do. It is the verb that matters, not the noun.

If this is not understood, we become symbol worshipers. The categories we once evolved and which were the tools we used in our intercourse with reality become hopelessly blunted. In these circumstances the social and political realities we are supposed to be grappling with change and reshape themselves independently of the collective impact of our ideas. We become the creature and no longer the partner of social realities. As we fumble with outworn categories our political vitality is sucked away and we stumble from one situation to another, without chart, without compass, and with the steering-wheel lashed to a course we are no longer following.

This is the real point of danger for a political party and for the leaders and thinkers who inspire it. For if they are out of touch with reality, the masses are not.

ANEURIN BEVAN, *In Place of Fear*

DATES AND INDEXES

THESE NOTES are being written and collected at 501 Kingley, Palo Alto, California, which is now the residence of Anatol and Gwen Rapoport and their daughter Anya. The date is early August, 1954. The Rapoports have just moved in, and their furniture has not yet arrived from Chicago. But there is a typewriter, and there is paper, so *ETC.* can keep on going. "What shall we put into 'Dates and Indexes'," asks SIH. "We can start out with the fact that you are here and I am here. Then we can write up the St. Louis Conference," replies AR. So that is how we are proceeding.

ANATOL RAPOPORT has moved to Palo Alto because he has accepted a position as research associate at the Center for Advanced Study in the Behavioral Sciences, a project supported by the Ford Foundation. The Center is to be housed in a beautiful group of buildings which has been put up on a wooded estate near the Stanford University campus: rows of offices for the research staff; a central building consisting of library, seminar rooms, dining facilities, and a small auditorium; all surrounded by gardens and landscaping. There a number of specialists from many fields of knowledge concerned with human behavior will attempt to think and work together towards the more rapid integration and advancement of the behavioral sciences. Other ISGS members who will be on the staff are Clyde Kluckhohn, professor of anthropology, Harvard University, and Kenneth E. Boulding, professor of economics, University of Michigan.

S. I. HAYAKAWA has just completed his third summer of teaching at San Francisco State College, which, having abandoned its downtown campus on Buchanan Street, is now in bright new buildings near Lake Merced, at 19th Avenue and Holloway, in the southwestern part of San Francisco. He gave an introductory lecture course in general semantics in the Language Arts Division and an advanced seminar in the Education Division of the College. He also lectured in the SFSC off-campus teacher training programs, conducted at the junior colleges in Modesto, Vallejo, Santa Rosa. At Vallejo he learned that during the past four years general semantics has been taught to all levels of supervision at the Mare Island Naval Shipyard of that city, and that the subject is also included in the curriculum of Vallejo's Department of Adult Education. At Mill Valley he had the pleasure of meeting with the members of the Marin County Chapter of ISGS at a reception held at the Tennis Club. In San Francisco he was interviewed on William Winter's program of news commentary over television station KPIX. Mr. Winter, the favorite news commentator of many ISGS members in the Bay Area, is now himself a member of ISGS. SIH also had the pleasure of meeting, at the home of Mr. and Mrs. B. E. Witkin of Berkeley, a number of people who are interested in forming an ISGS chapter in East Bay.

"THE PRIVILEGE of getting to know more about the outstanding work of the International Society for General Semantics was one which I shall not soon forget," writes E. S. Brandenburg, assistant dean of University College, Washington University. "Washington University was honored by the presence of the Second Conference on General Semantics.

We consider your meeting one of the most outstanding we have ever had the opportunity of bringing to Washington University and the St. Louis community."

The success of the Second Conference on General Semantics, June 10 to 12, was only partially due to the efforts of the officers of ISGS. A large share of the credit must go to the administration of University College, Dean Willis H. Reals and Assistant Dean Brandenburg, and to the officers and members of the St. Louis Chapter of ISGS, especially Dr. John J. Kessler and Mrs. Frances Hood. The close attention to details of arrangements for the many sessions resulted in a meeting that ran exceptionally smoothly. The deepest thanks of ISGS are due to University College of Washington University and the St. Louis Chapter for their hospitality, their care, and their thoughtfulness.

AS FOR THE CONTENT of the meeting, we shall have to ask those members who were not present to judge for themselves as papers from the Conference are published in *ETC.* in this and ensuing issues. The program was as follows:

PROGRAM OF THE
SECOND CONFERENCE ON GENERAL SEMANTICS

Thursday, June 10

8 p.m. ST. LOUIS WELCOMES THE CONFERENCE.
WILLIS H. REALS, Dean, University College, Washington University.
JOHN J. KESSLER, President, St. Louis Chapter, ISGS.
"The Semantics of Politics," the Honorable CLIFFORD JONES, Missouri State Legislature.

Friday, June 11

9:30 a.m. FRAMEWORKS OF THOUGHT. *Chairman:* EARNEST BRANDENBURG, Assistant Dean, University College, Washington University.
Presidential Address: "General Semantics and the New Behavioral Sciences," ANATOL RAPOPORT, University of Chicago.
"Conscious Use of Models in Studying Human Behavior," C. W. DALLEY, M.D., Fort Douglas V. A. Hospital, Salt Lake City, Utah.
"Semantics from the Greek Skeptics to Korzybski," JOHN J. KESSLER, St. Louis.
Discussion Leader: EUGENE E. SEUBERT, Department of Education, Washington University.

1:00 p.m. THE SEMANTIC ENVIRONMENT AND HUMAN RELATIONS.
Chairman: ALEXANDER BUCHAN, Department of English, Washington University.
"Extensional Methods in Training for Journalism," HOWARD BOONE JACOBSON, University of Bridgeport, Bridgeport, Conn.
"Semantic Difficulties in International Communication," EDMUND S. GLENN, Department of State, Washington, D.C.
"Language and the Law," JULIUS PAUL, Ohio State University, Columbus, Ohio.
"How Planning for Human Welfare Tends to Become an End in Itself," LEO BOHANON, Urban League, St. Louis.
"General Semantics and Human Relations," ALFRED FLEISHMAN, Fleishman-Hillard, Inc., St. Louis.

6 p.m. RECEPTION AND DINNER: KINGSWAY HOTEL. *Chairman:* ROBERT HOLSTON, President, New York Society for General Semantics.
Exhibit: "Danger: Men Talking," drawings to illustrate semantic principles, by WILLIAM H. SCHNEIDER, vice-president, Donahue and Coe, New York City.
"What's Up, Doc?" and Other Poems, readings by CLAUDE COLEMAN, Southern

Illinois University, Carbondale, Illinois. [Mr. Coleman being unable to be present because of illness, JOHN J. KESSLER read some poems from his own volume of verse, *Zeus is Speaking.*]

"Perception Theory and General Semantics," F. P. KILPATRICK, Princeton University, Princeton, N.J.

"Popular Songs vs. The Facts of Life," S. I. HAYAKAWA, Editor, *ETC.: A Review of General Semantics.*

Saturday, June 12

9:30 a.m. CONTRIBUTIONS TO SEMANTIC THEORY. *Chairman:* LEWIS E. HAHN, Department of Philospohy, Washington University.

"Mechanical Translation," ERWIN R. REIFLER, University of Washington, Seattle, Washington.

"Measuring the Inference-Observation Confusion," WILLIAM V. HANEY, De Paul University, Chicago, Illinois.

"Historical Illustrations of Concept Formation," ROBERT PLANK, Veterans Administration Regional Office, Cleveland, Ohio.

"A Behavioral Theory of Value," HENRY N. PETERS, V. A. Hospital, North Little Rock, Arkansas.

1:00 p.m. GENERAL SEMANTICS AND MENTAL HEALTH. *Chairman:* FRANCIS HOOD, Secretary, St. Louis Chapter, ISGS.

"The Psychiatric Technique of Abraham Low," HARRY L. WEINBERG, Temple University, Philadelphia, Pa.

"Self-Corrective Therapy: A Semantic Approach to Counseling," W. H. PEMBERTON, Mill Valley, California.

"Some Contributions of Stuttering Research to Personality Theory and Psychotherapy," WENDELL JOHNSON, University of Iowa, Iowa City, Iowa.

"Semantic Psychoanalysis: The Theories of Gaston Bachelard," J. S. BOIS, Bois and Howard, Montreal, Quebec, Canada.

"A Counseling Course in the Chicago Public Schools," CATHERINE MINTEER, Chicago Public Schools.

Discussion Leader: GEORGE SASLOW, M.D., Department of Psychiatry, Washington University School of Medicine.

7:30 p.m. GENERAL MEMBERSHIP MEETING AND CONFERENCE REVIEW. *Chairman:* ANATOL RAPOPORT. *Discussion leaders for summaries and review:* M. KENDIG, Director, Institute of General Semantics, Lakeville, Conn., JOHN J. KESSLER, St. Louis.

IT IS WITH PROFOUND REGRET that we report the death on April 29, 1954, of Dr. Richard D. Loewenberg, of Bakersfield, California, at the age of 55. Dr. Loewenberg, psychiatrist and neurologist and an early member of ISGS, fell suddenly ill while lecturing to a class of medical students at the University of Southern California and died two days later in a Los Angeles Hospital.

Born in Hamburg, Germany, Dr. Loewenberg got his medical degree from the University of Goettingen in 1923. After practicing in Germany for ten years, he went to China, where, in addition to practising neuropsychiatry, he served on the staff of the Pung Nan Medical College in Shanghai. He came to the United States in 1938 and served on the staff of St. Joseph's Hospital in San Francisco. From 1942 to 1944 he lived in Portola, California, where he was a member of the staff of the Western Pacific Railroad Company Hospital. From Portola, he sent his first contribution to *ETC.*, "Georg Christoph

Lichtenberg: An Eighteenth Century Pioneer of Semantics," which appeared in Vol. I, No. 2 (Winter 1944).

In 1944, Dr. Loewenberg moved to Bakersfield, where he served the county public health department in addition to maintaining his private practice. He was chief of services for the neuropsychiatric division at the Kern County General Hospital. The Bakersfield *Californian* reports, "In recent years he was a familiar figure in many court trials and his opinion was frequently sought in criminal cases involving persons suspected of being insane or psychopathic." He published many scientific papers, in *Johns Hopkins Hospital Bulletin, China Medical Journal, Journal of Clinical Medicine, Journal of Criminal Psychopathology, Bulletin of the History of Medicine,* and many others.

To readers of *ETC.,* Dr. Loewenberg will be remembered best for his profoundly moving article, "Speech Impulse and Language Frustration," which appeared in our Winter 1951 issue. In this article, he wrote, "From my own experiences as a physician, working for a lifetime in three continents, among many different nations and tongues, I have observed a common denominator among many and varied speech experiences. Language distress appears as one of the fundamental experiences of human frustration." From this fact of his own experiences as he moved from Europe to Asia to America, he goes on to explore the common problems of three groups who have difficulty in communication, (1) the aphasic, (2) children, and (3) immigrants. Immigrants, he wrote, like the deaf, "may develop paranoid reactions. The sense of loneliness . . . mobilizes mechanisms of self-reference." "How language influences our entire perception and experience will be clear to every newcomer in a foreign country: when he has a chance to speak his mother tongue he may notice that the whole scene feels closer to him and clearer than when he is painstakingly stuttering the new language." The need to communicate, Dr. Loewenberg stated, is a much deeper need than is generally recognized. He was deeply interested, therefore, with "bridge languages" such as Pidgin English and Esperanto, as he was in all other endeavors, whether linguistic or psychological, to improve communication among men.

MIRA EDGERLY Korzybska, widow of Alfred Korzybski, died at the age of 82 in Chicago on July 13. She was born in Ann Arbor, Michigan, where her father was general manager of the Michigan Central Railroad, later lived in Kansas City, Missouri, and married Korzybski in Washington, D.C., in 1919, at the time when he was working on *Manhood of Humanity,* his first major work. A portrait-painter, Mrs. Korzybski's work is represented in the collections of the Art Institute of Chicago and the Metropolitan Museum of New York. She was especially noted for her technique of painting miniature portraits on ivory. She did portraits of many distinguished personages both in the U.S. and in Europe, employing this technique. The Kansas City *Times,* in an obituary notice, quoted her theory of art as given before the Kansas City Women's City Club on the occasion of an exhibition of paintings there in 1920: "It is the job of the artist to find a concept of personality of a sitter before beginning a portrait. It is a simple matter. Find something that will excite them, and harp on that. Bring out enmity, malice, if necessary, but be sure to arouse some dominant trait."

WE NOTE WITH REGRET, too, the passing of a valued charter member of ISGS, Dr. David Fairchild, on August 6 at the age of 85. Dr. Fairchild, of Coconut Grove, Florida, was a famous horticulturist and agricultural explorer, who organized and for many years directed the office of plant introduction in the Department of Agriculture. He was in charge of numerous botanical expeditions into distant parts of the world: the Philippines, Celebes, Java, Bali, the Moluccas, Colombia, Panama, Guatemala, Yucatan,

and many other places. He introduced many different tropical plants into the United States, and the Fairchild Tropical Garden at Coconut Grove was named in his honor. He wrote many books about his travels and his observations of both human and plant life, among them, *Exploring for Plants* (1930), *The World Was My Garden* (1938), *Garden Islands of the Great East* (1945), and *The World Grows Round My Door* (1947). Dr. and Mrs. Fairchild (she is the daughter of Alexander Graham Bell) were pioneers in their interest in general semantics. One of Korzybski's first lectures on time-binding was given in the Fairchild home, then in Washington, D.C. Dr. Fairchild also served as honorary trustee of the Institute of General Semantics, where he lectured in 1940 (the Institute was then in Chicago). The Editor recalls with deepest gratitude the inspiration he received from the lecture and the encouragement he received from Dr. Fairchild both in personal conversation and in subsequent correspondence.

IN THE QUARTERLY journal, *Studies in Linguistics,* edited by George L. Trager, there appears in the September-December, 1953 issue the following short comment on William G. Leary's article, "Studies in Language and Culture in the Training of Foreign Service Personnel," which appeared in *ETC.*'s Special Issue on Metalinguistics (Spring 1952): "A good account of the development of the Foreign Service Institute and its School of Languages and Linguistics up to the middle of 1952. Shortly after the new administration came into power, a reorganization reduced the Institute's status, abolished its schools by creating two 'branches'—a Language Training Branch and a Specialized Training Branch [for everything else], and instituted economy and other measures that have led to a serious weakening of the Institute in terms of staff and effectiveness."

ONLY IN JULY 1954 did the Editor learn, on visiting the Oregon College of Education at Monmouth, Oregon, of a two-day intensive seminar on general semantics at that institution, held a year earlier, July 17 and 18, 1953, and conducted by Dr. O. R. Bontrager of Pennsylvania State Teachers College and Dr. Douglas M. Kelley of the University of California. Eighteen hours of lecture, discussions, and demonstration were devoted to applications of general semantics in communication, human relations, and counseling. The Editor is always glad to publish news of this kind in this department, but he would prefer to have it sent to him rather than picking it up a year later on a visit to the place where it happened. Sometimes it is necessary to remind members of ISGS that postal services exist, and that we cannot run this department by telepathy.

AMONG THE MORE fascinating items to come to the attention of this department in recent months is a 12″ LP record, Harry Partch's "Plectra and Percussion Dances: Satyr-Play Music for Dance Theater," played by the Gate 5 Ensemble. Harry Partch, whose studio in Sausalito we were privileged to visit this summer, is a composer who is not satisfied with existing musical instruments and has therefore constructed his own, for which he writes his own strangely original music. Among the instruments are the "kithara," with 72 strings in chords of six each in a lyre-type body; the "harmonic canon," with 44 strings; the "diamond marimba" and "bass marimba," all hand-hewn and hand-constructed; "cloud-chamber bowls," which are tops and bottoms of Pyrex carbuoys, producing bell-like tones; and adapted forms of the viola, the guitar, and the reed organ, the latter tuned to a 43-tone-to-the-octave scale. Mr. Partch's book in explanation of his musical philosophy, *Genesis of a Music* (University of Wisconsin Press, 1949), when reviewed in *ETC.* by William Kay Archer in the Winter 1951 issue, aroused much interest and curiosity among our readers. Those who wish to expose themselves to Partch's new musical language can do so by sending $8 (which includes postage and in-

surance) for the "Plectra and Percussion Dances" to Gate 5 Ensemble, 3030 Bridgway, RFD 67, Sausalito, California. The members of Gate 5 Ensemble, all professional musicians (most of them, interestingly enough, with jazz experience), have dedicated themselves to learning to play Partch's instruments and performing on them as a labor of love, out of their belief in the validity of his musical explorations.

AND TALKING about phonograph records, we are reminded of another exciting musical experience, namely the 12" LP Columbia record of the Azuma Kabuki Musicians (ML4925) playing the music that accompanied the presentations of the Azuma Kabuki Dancers in their highly successful American tour in February to June, 1954. If *ETC.* had a theatrical department, we could go on for pages about the beauty and strange symbolism of the Kabuki plays; if we had a music department, we could review the recording of the exciting sounds and rhythms that constitute Japanese music. Since we have neither, there is not much excuse for bringing the matter up, except for the fact that Stage Manager for the Azuma troupe on its American tour was an ISGS member, Mr. Richard Martin, of New York.

THE DETROIT Society for General Semantics meets regularly on the second Thursday of each month at 7 p.m. at the main YMCA. Visitors are always welcome. The Detroit Society maintains a library of general semantics from which members may borrow books without charge. Study groups are being organized in different parts of the Detroit metropolitan area, and it is expected that six such groups will be meeting in the fall of 1954. Information about the Detroit Society may be obtained from its president, Mr. A. F. Rand, 1231 Cass Avenue, Detroit 26.

ROSE POLYTECHNIC Institute at Terre Haute, Indiana, offers regularly a two-hour, one-semester, elective course in general semantics for engineering students, taught by Gordon K. Haist, a charter member of ISGS and, if we remember correctly, one of its founders. Looking at our membership records, we find that we have never had more than one member in Terre Haute—and that one has always been Mr. Haist. We would therefore urge Mr. Haist—as we urge other teachers of courses in general semantics—to propose for membership in ISGS some of their most interested students.

LLOYD AND MARY MORAIN, authors of the recent book *Humanism as the Next Step* (Boston: Beacon Press, $2), write as follows to students of general semantics: "Our book was written out of a long background of interest in general semantics. Lloyd was president of the Los Angeles Society for General Semantics in 1939 and 1940. Mary, then Mary Dewing, was also active in that society. Since that time we have become increasingly interested in the application of the scientific method to the larger questions of men's relationships to each other and the universe. We wondered if it were possible to have a viewpoint which was in harmony with scientific knowledge yet which did not do violence to the methods of general semantics—to such concepts as levels of abstraction, non-identity, and inter-relationship.

"We have come to feel that the modern humanist position, based in part on a tradition extending to ancient Greece, meets these criteria to some extent. We believe that the rigorous application of general semantic methods leads to a broad humanist position. For us, this philosophy has increased the usefulness of general semantics. Humanism, as a framework, and general semantics, with its incisive techniques, complement each other. Therefore, you can see wherein we are equally interested in both. . . . Accordingly, we tried to make our little book, *Humanism as the Next Step*, a practical one showing the extensional philosophy in relation to some personal and social problems."

INDEX TO VOLUME XI

(Note: Authors of articles and reviews are listed in CAPITAL LETTERS.)

Allport, Gordon W., *The Nature of Prejudice,* rev. by David Bidney, 226.

ANDERSON, ALAN ROSS, review of *Philosophy and Psychoanalysis* by John Wisdom, 64.

Announcement of 1954 Meeting of ISGS, 71.

BATESON, GREGORY, "Why Do Things Have Outlines?" 59.

Berman, Sanford, "On General Semantics Training" (letter), 238.

BIDNEY, DAVID, review of *The Nature of Prejudice* by Gordon Allport, 226; "Culture, Symbols, and Philosophy" (letter), 237.

Bossard, James H. S., *The Sociology of Child Development,* rev. by Henry Clay Lindgren, 231.

BYKHOVSKY, B. E., "Mechanists, The Servants of Imperialism," 186.

CATTON, WILLIAM R., JR., "The Mountain with the Wrong Name," 299.

COLEMAN, CLAUDE, "What's Up, Doc?" 122.

"Communication and the Open Self," Earl C. Kelley, 96.

"Communication in Science Fiction," Robert Plank, 16.

"Conscious Use of Models in Ethical Analysis," Antony G. N. Flew, 284.

"Danger: Men Talking" (drawings), William H. Schneider, 181; 243.

Dates and Indexes, 75; 156; 312.

de Beauvoir, Simone, *Ethics of Ambiguity,* rev. by Whitaker T. Deininger, 229.

DEININGER, WHITAKER T., review of *Ethics of Ambiguity* by Simone de Beauvoir, 229.

"Design as Metaphor," Weller Embler, 101.

DETTERING, RICHARD, review of *Positivism: A Study in Human Understanding* by Richard von Mises, 68.

DODD, STUART CARTER, "Three Semantic Exercises: 'Time,' 'Quality,' and 'God,'" 41.

EMBLER, WELLER, "Design has Metaphor," 101.

FEIN, ELIHU, "Notes on the Limitations of Language," 308.

FLAMM, IRVING H., "How to Sell a Vision," 220.

FLEW, ANTONY G. N., "Conscious Use of Models in Ethical Analysis," 284.

Flowers, Paul A., "Tyranny of Stereotypes" (letter), 155.

FOUCH, ROBERT S., "The Un-Sanity of Mathematics and Its Teaching," 113.

GAREY, DORIS B., "The Mask of Night," 305.

"Gestalt Mnemonics," Max Sherover, 130.

GLENN, EDMUND S., "Semantic Difficulties in International Communication," 163.

"Grammar of Assassination, A," Martin Maloney, 83.

"Group Discussion—Specific or Panacea?" Harry L. Miller, 49.

HACKETT, HERBERT, "Language as Communication: A Frame of Reference," 290.

HAYASHI, KAZUO, "On Children's Culture," 217.

"How to Sell a Vision," Irving H. Flamm, 220.

"Is General Semantics 'Logical'?" Edmund N. Todd, 125.

"Is Man an Animal? A Study in Persuasive Definition," John R. Kirk, 204.

JOHNSON, WENDELL, "The Spoken Word and the Great Unsaid," 28.

KELLEY, EARL C., "Communication and the Open Self," 96.

KIRK, JOHN R., "Is Man an Animal? A Study in Persuasive Definition," 204; review of *From a Logical Point of View* by W. V. Quine, 227.

"Language as Communication: A Frame of Reference," Herbert Hackett, 290.

LEE, IRVING J., "Procedure for 'Coercing' Agreement," 193.

LINDGREN, HENRY CLAY, review of *The Sociology of Child Development* by James H. S. Bossard, 231.

Lindgren, Henry Clay, *The Art of Human Relations,* rev. by Eleanor Parkhurst, 134.

MALONEY, MARTIN, "A Grammar of Assassination," 83; review of *You Shall Know Them* by Vercors, 139.

"Mask of Night, The," Doris B. Garey, 305.

"Mechanists, The Servants of Imperialism," B. E. Bykhovsky, 186.

MEYERS, RUSSELL, "Report of Retiring President," 73.

MILLER, HARRY L., "Group Discussion—Specific or Panacea?" 49.

MONTAGU, ASHLEY, review of *Introduction to Logical Theory* by P. F. Strawson, 143.

"Mountain with the Wrong Name, The" William R. Catton, Jr., 299.

Murdock, Clotye, "Educating the Pekinese" (letter), 144.

"Notes on the Limitations of Language," Elihu Fein, 308.

"Obstacles to Creativity," Melvin Tumin, 261.

"On Children's Culture," Kazuo Hayashi, 217.

PARKHURST, ELEANOR, review of *The Art of Human Relations* by Henry Clay Lindgren, 134.

Parsons, Howard, "The Mystic and His Words" (letter), 152.

PEARSON, A. W., review of *History of American Psychology* by A. A. Roback, 139.

PLANK, ROBERT, "Communication in Science Fiction," 16.

"Procedures for 'Coercing' Agreement," Irving J. Lee, 193.

Quine, Willard Van Orman, *From a Logical Point of View,* rev. by John R. Kirk, 227.

RANDLE, MARTHA CHAMPION, review of *Personality Development* by J. S. Slotkin, 142.

RAPOPORT, ANATOL, "Technological Models of the Nervous System," 272; "Errata: Dr. Weaver's Article" (letter), 240; "Reply by Rapoport" (letter), 150.

"Report of Retiring President," Russell Meyers, 73.

Roback, A. A., *History of American Psychology,* rev. by A. W. Pearson, 139.

ROGERS, CARL, "Toward a Theory of Creativity," 249.

SCHNEIDER, WILLIAM H., "Danger: Men Talking" (drawings), 181; 243.

"Shall We Sit Idly By?" Herbert A. Thelen, 3.

SHEROVER, MAX, "Gestalt Mnemonics," 130.

Sloan, Harold S., "Gold and the Abstraction Ladder" (letter), 233.

Slone, Ralph W., "Is Ethics Concerned with Survival Alone?" (letter), 148.

Slotkin, J. S., *Personality Development,* rev. by Martha Champion Randle, 142.

"Spoken Word and the Great Unsaid, The," Wendell Johnson, 28.

Strawson, P. F., *Introduction to Logical Theory,* rev. by Ashley Montagu, 143.

"Technological Models of the Nervous System," Anatol Rapoport, 272.

THELEN, HERBERT A., "Shall We Sit Idly By?" 3.

"Three Semantic Exercises: 'Time,' 'Quality,' and 'God,'" Stuart Carter Dodd, 41.

TODD, EDMUND N., "Is General Semantics 'Logical'?" 125; "On Language-Fact Relations" (letter), 234.

"Toward a Theory of Creativity," Carl R. Rogers, 249.

"Toward Philosophical Anthropology?" Hermann Wein, 21.

TUMIN, MELVIN, "Obstacles to Creativity," 261.

"Un-Sanity of Mathematics and Its Teaching, The," Robert S. Fouch, 113.

Vercors, *You Shall Know Them,* rev. by Martin Maloney, 136.

von Mises, Richard, *Positivism: A Study of Human Understanding,* rev. by Richard Dettering, 68.

WEIN, HERMANN, "Toward Philosophical Anthropology?" 21.

"What's Up, Doc?" Claude Coleman, 122.

"Why Do Things Have Outlines?" Gregory Bateson, 59.

"Will Materialism Run Out of Materials?" Kenneth Winetrout, 223.

WINETROUT, KENNETH, "Will Materialism Run Out of Materials?" 223.

Wisdom, John, *Philosophy and Psychoanalysis,* rev. by Alan Ross Anderson, 64.

THE BRITISH JOURNAL FOR THE PHILOSOPHY OF SCIENCE

Contents of the November Issue, 1954

Articles:

THE AGE OF THE UNIVERSE	Michael Scriven
THE AGE OF THE UNIVERSE	J. T. Davies
THE AGE OF THE UNIVERSE	J. Öpik
THE AGE OF THE UNIVERSE	G. T. Whitrow
THE AGE OF THE UNIVERSE	Richard Schlegel
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